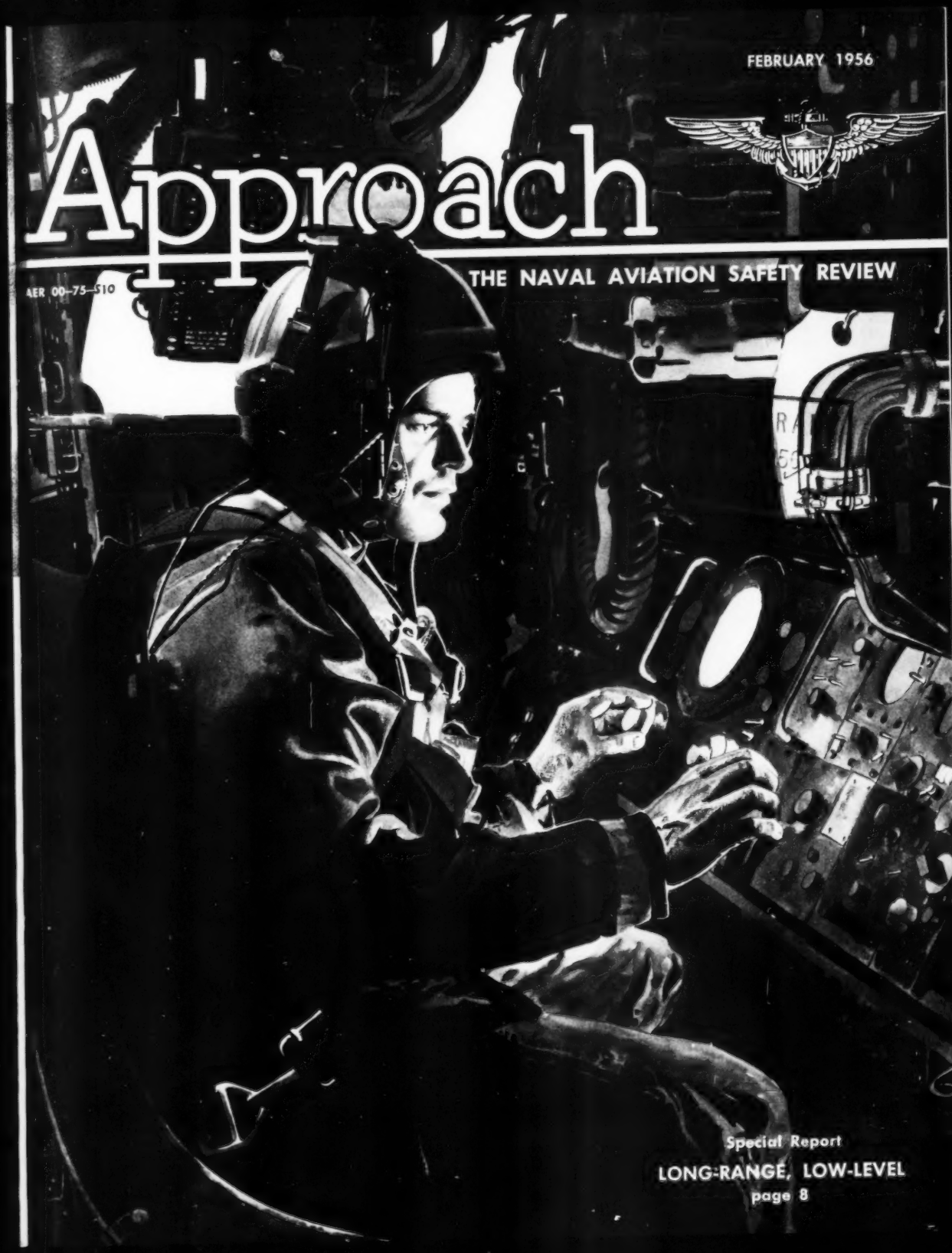
FEBRUARY 1956
Approach
THE NAVAL AVIATION SAFETY REVIEW
AER 00-75-S10
Special Report
LONG-RANGE, LOW-LEVEL
page 8

Approach

THE NAVAL AVIATION SAFETY REVIEW

FEBRUARY 1956

Vol. I No. 8

Prepared by the U.S. Naval Aviation Safety Center

Director
CAPT M. B. Williams, USN

Head, Literature Department
CDR P. L. Ruehrmund, USN

Editorial Staff

Editor, A. B. Young, Jr.; Managing Editor, LCDR R. P. Brewer; Associate Editors: LCDR R. A. Eldridge; J. T. Le Barron, JOC; J. C. Kiriluk. Contributing Editors: CDR A. P. Rush (MC); H. M. Howard.

Art and Production Staff

Art Director, R. A. Genders. Illustrators: LT E. T. Wilbur, R. B. Trotter, V. L. Fletcher, DM1; Production Asst. M. Roffo, DM2.

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IN THIS ISSUE

Command Editorial 1
Safety Award Winners 2
Letters to the Editor 6

FLIGHT OPERATIONS

Long-range, Low-level 8
Spinning the TV 13
Anymouse and His Hairy Tales 16
Truth and Consequences 20
Canted Deck Tales 24

AERO-MEDICAL

High Altitude Ejection 28
Notes from Your Flight Surgeon 31
Be Calm, Be Cool, Be Collected 32

AIRCRAFT MAINTENANCE

Jet Engine Enemy No. 1 36
From the Ground Up 39

SPECIAL FEATURE

Region of Reverse Command, Primer for Pilots No. 6 40

ON THE COVER—The Man Behind The Man At The Wheel—that's the aircrewman of today's naval aviation. Navigation, search operation, target pinpointing—these are but typical of the TEAMWORK functions of air and ground crews to achieve the highest degree of effectiveness in flight operations.

Like to reduce your chances of undershooting, and improve your FCLP and carrier patterns?
Want to fly that multi-engine bird right with an engine out?
Sure you do . . . but brute strength won't do it. Knowledge and application of the aerodynamics of the situation will. So grab a chair and flip to page 40 for the "Region of Reverse Command."

D. V. GALLERY
Rear Admiral, U.S. Navy,
Chief of Naval Air Reserve Training

It should be unnecessary to preach to aviators on the subject of safety.

All the older ones know that the only reason they ever got old was that in their younger days they lived constantly with the idea that accidents can happen to the best of us, but can be prevented with reasonable care by any of us.

The most dangerous period of any naval aviator's career is his first couple of years out of Pensacola when he knows he is the world's greatest aviator, but is afraid most other people don't.

If you can drill safe flying habits into yourself during this period, you can look forward to eventually becoming a crony of Grampaw Pettibone.

D. V. Gallery

P.S. To those who have the first two years behind them—and especially to my Weekend Warriors:

Just because you've been able to walk away from your landings so far, don't think you can dope off now, . . . take it easy, doublecheck everything, and know your own limitations.

WASP

"Safety was never sacrificed for speed." In the opinion of ship's personnel that was the primary reason for the award won by the USS *Wasp*. In order to maintain operational readiness, the *Wasp* was always kept in the peak of condition, making over 600 recoveries during CarQuals in the summer of 1954. In September the ship began a 7½-month cruise to join the Seventh Fleet in the Far East.

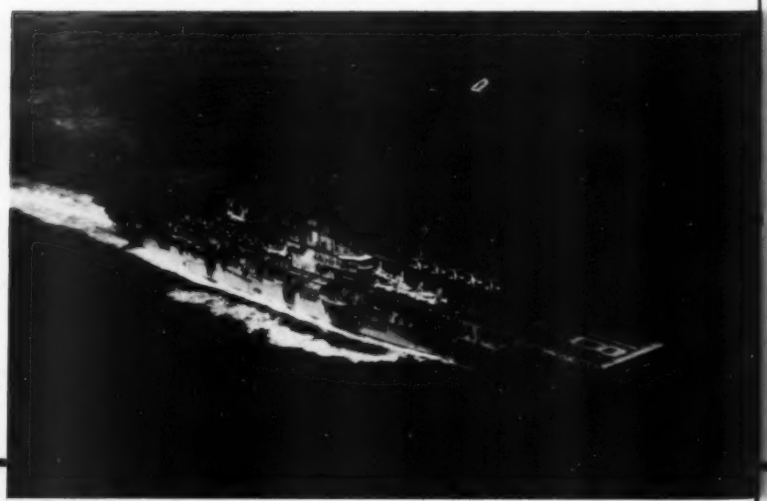
During a change of command on 18 May 1955, Capt. D. J. Welsh, left, congratulates his relief, Capt. R. W. Denbo.

It was in Pearl Harbor, during the regular operational readiness inspection, that the pattern of air operations was set. The pilots and men of Air Task Group ONE (ATG-1) supported by the entire crew of the *Wasp* rated an outstanding level of performance.

The *Wasp's* operational readiness and high safety level were highlighted during the evacuation of the Tachen Islands by Chinese Nationalist forces. Nearly a thousand aircraft were launched and recovered. A cruise record for launching 12 jets was set; 3 minutes and 9 seconds.

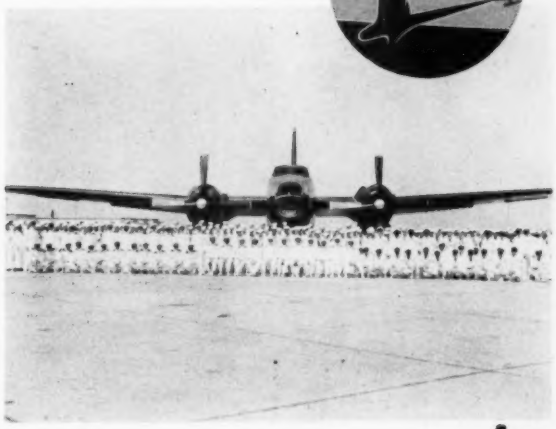
While operating in the South China seas, Formosan and Korean waters 3899 arrested landings were made by the *Wasp*.

Comdr. F. E. Standring, USN
Air Officer and Aviation Safety Officer



AWARD WINNERS

P-7



During fiscal 1955 Patrol Squadron Seven was based at Port Lyautey, French Morroco for five months where the squadron averaged over 900 accident-free flying hours per month. It also operated from Roosevelt Roads, Puerto Rico during Operation Springboard '55 and participated in Operation Lantflex, flying from its home base of Quonset Point. In a search for a missing R7V the squadron flew 355 hours in 35 sorties from Norfolk, Va.

While based at Port Lyautey VP-7 engaged in numerous exercises with the Sixth Fleet and NATO units. A pleasant portion of this training was familiarization with airfields in various countries and the problems involved in operating on overseas airways. Flights were scheduled to a total of 14 countries in Europe, Scandinavia, Africa and the Near East.

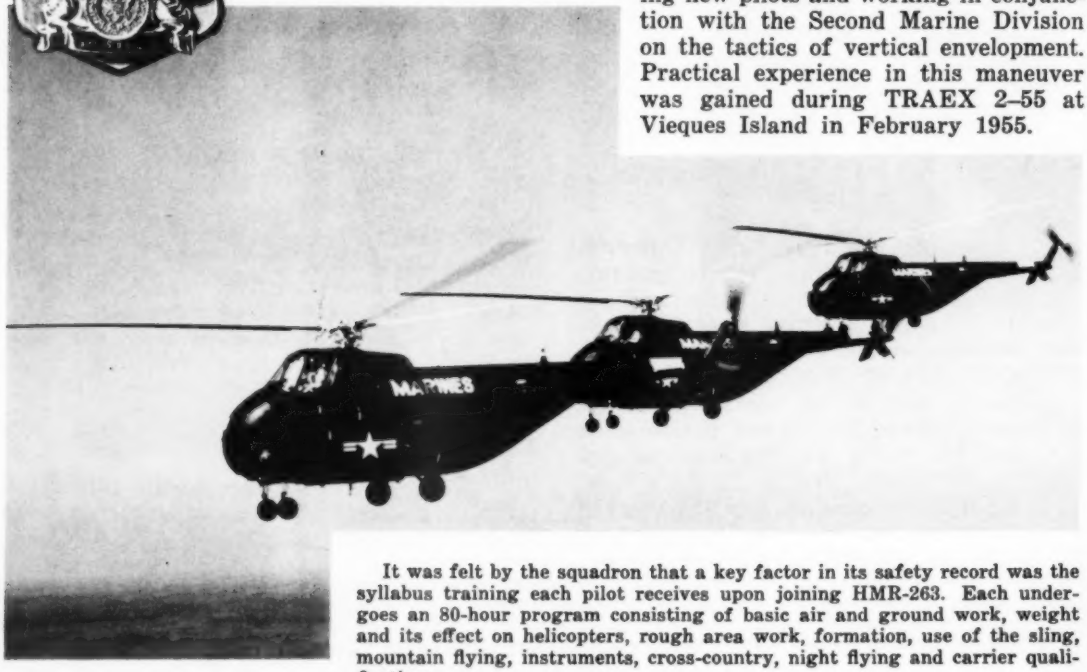
Squadron personnel noted that the operations which impressed safety consciousness on everyone were at a particular Italian airfield. The short runway and unavailability of 115/145 fuel generated a good deal of thought and discussion concerning flight safety and emergency procedures.

Comdr. D. W. Bowman, USN
Commanding Officer

Lt. Comdr. William B. Dever, USN
Squadron Safety Officer

HMR-263

In July of 1954 Marine Helicopter Transport Squadron 263 moved from Cherry Point to New River, N. C. Throughout the following months the squadron continued a program of training new pilots and working in conjunction with the Second Marine Division on the tactics of vertical envelopment. Practical experience in this maneuver was gained during TRAEX 2–55 at Vieques Island in February 1955.



It was felt by the squadron that a key factor in its safety record was the syllabus training each pilot receives upon joining HMR-263. Each undergoes an 80-hour program consisting of basic air and ground work, weight and its effect on helicopters, rough area work, formation, use of the sling, mountain flying, instruments, cross-country, night flying and carrier qualification.

While winning the safety award, the squadron operated the oldest HRS model aircraft, the HRS-1 and -2. The commanding officer considered this award a tribute to the maintenance crews and pilots.

Lt. Col. C. W. Korf, USMC
Commanding Officer

VA-115

At the beginning of fiscal 1955 Attack Squadron 115 was engaged in intensive training in dive, glide and other bombing maneuvers, close air support, aerial mining, rockets and strafing. In addition, the usual night and instrument flying was conducted. In October 1954 the squadron departed for the Far East aboard the USS *Kearsarge* as part of Carrier Air Group 11. Operations were conducted in the Philippines, Formosa and Japanese areas.

Comdr. C. L. Dillard, USN
Commanding Officer

The month of February 1955 found VA-115 flying cover for the Tachen Islands evacuation off the China Coast. Upon completion of that operation the squadron visited the British Crown Colony of Hong Kong. A trip to Singapore was also made during which the 104 polliwogs of VA-115 became shellbacks in a colorful ceremony.

On 12 May the squadron returned to San Diego to complete a seven-month tour during which they logged 3824 hours and 1171 day and 38 night carrier landings.

Lt. D. L. Griewisch, USN
Aviation Safety Officer

Letters to the Editor

Letters may be forwarded via official channels or Anymouse Reports. Address: *Approach* Editor, U. S. Naval Aviation Safety Center, NAS, Norfolk 11, Virginia.

Sir:

Your October issue printed the article "Hot and Long" revealing the tale of a TV-2 landing hot and/or long on a wet 8000-foot runway after completing a PPI. The final approach was made at 140 knots with a gross weight of approximately 12,000 pounds, and in weather that was near PPI minimums. Cause of the accident was given as pilot error in that he failed to execute a wave-off and either execute another approach or proceed to his alternate.

Touchdown speed of a TV-2 with the above weight is approximately 100 knots. Breaking out at 100 feet altitude with 120 knots over the approach end of a wet 8000-foot runway would mean that the pilot would touch down 1500 to 2000 feet from the approach end leaving 6000 feet for stopping. On a wet runway, the TV-2 would roll another 2000 feet before brakes started to grab leaving 4000 feet of usable runway. This is hardly sufficient stopping distance.

It is not luck that some pilots make successful landings after a GCA or PPI approach when minimums prevail. The following habits will provide the margin for safe, successful approaches on the first pass:

1. Make the final approach 15 knots above stall.

2. In the TV-2 retract flaps for better braking action. If you are not slowing or feel that you will overrun, flame out the engine. The TV-2 idles at about 35% rpm and tends to stabilize at about 65 knots at idle rpm on rollout.

3. Complete all GCA practice approaches to touchdown. While traffic at most stations is too heavy for this, squeeze in as many as possible.

4. Don't rely fully on the controller. Use the altimeter and whatever radio aids you may have available to verify the information given by GCA.

The Naval Aviation Safety Center should give serious consideration to item 3. Qualifying a person for GCA on his instrument ticket when he has not demonstrated his ability to complete a GCA to touchdown during visual practice is one form of increasing the attrition rate.

Anymouse

Thanks for your good suggestions, Anymouse. For more on wet runway landings, review "Don't Skid Yourself," January/February 1955 NAVAL AVIATION SAFETY BULLETIN.

Sir:

In the November 1955 (page 14) edition of *Approach* a recent wheels-up landing accident of a F9F-6 fam pilot was discussed.

To prevent a recurrence of this type accident, it is suggested that the procedure exercised in my squadron be considered by other squadrons.

On all familiarization hops which are to include touch-and-go landings, the fam pilot is required to have the aircraft's wheels and flaps in the down position at all times while he is in the landing pattern. If at anytime he does desire to raise the landing gear he must depart the landing pattern and re-enter the break prior to landing.

The same procedure is executed following a wave-off at all times, fuel permitting, even after the fam stage of operations has been completed. It is strongly recommended that this procedure be used during night landings, as the wheel watches are not as effective at this time. The advantages are apparent following a waveoff at night which is executed at a strange field.

If this procedure is executed, and the landing checkoff list completed prior to each landing, more potential wheels-up landings will be eliminated.

Ltjg — — —, Safety Officer, VF - - -

This method is sure easier than writing an AAR on a wheels-up landing.

FLIGHT OPERATIONS

SECTION

If your duties include flying long-range low-level missions, you'll want to sample the article beginning on the next page. On page 13 Lockheed Pilot Sammy Mason enlightens jet drivers on "Spinning the TV." Fleet pilots with combat experience may find themselves mirrored in the parable "Canted Deck Tales," page 24.

Long-range, low-level

The continuing importance of the long-range, low-level mission in today's naval strategy makes an account of the flight problems encountered a significant subject. Here, for pilots, aircrewmen and operations staffs, is a report on the subject.

"THE first six hours of the flight were routine and uneventful . . ."

So begins the report of a recent fatal AD aircraft accident, the details of which highlight a significant, growing problem in naval aviation.

The current importance of long-range low-level special missions, through which attack aviation has assumed a greatly increased striking power, has also brought with it some unusual conditions and problems not ordinarily encountered in flight operations. This brief of what began as a "routine and uneventful" flight is considered representative of many of the conditions which a low-level navigation flight may encounter.

For the pilot who is subject to flights of this or similar nature there are answers which may be applied to the problems—but a thorough understanding of problems *and* answers is the requirement for *safe*, effective flight operations. Here, for the wise

pilot is a cross-section of these problems and answers.

The Details

". . . routine and uneventful." Penetration of the coast was made after an hour and a half with all weather located well to the eastward of course. However, on the return leg, instrument conditions prevailed in this area from the coastline some 40 miles inland. Topography of this section was marked by mountainous terrain with peaks of about 4000 feet and winding valleys two or three thousand feet below.

At this point the flight encountered a solid overcast which extended from 500 feet to an undeterminable height, obscuring valley areas as well as the tops of the mountains. Both pilots (pathfinder and wingman) elected to begin a climb while still VFR in an attempt to penetrate through an estimated clear layer of 1000 feet occurring about 7000 to 8000 feet. At 7000 feet penetration was begun, at 160 knots.

It was then that the wingman called "I have lost you, make a 180 and I will join up again." Leader acknowledged and began a port turn. After about 40 degrees of the turn the wingman advised he had the leader in sight and to return to base course. Thereafter no further transmission was heard, and after five minutes the leader attempted unsuccessfully to call the wingman.

Continuing to call, the leader proceeded the remaining 20 miles to the coast obtaining no answer from the wingman. The leader circled in a clear area near the coast line until low fuel forced his departure.

Later, the wreckage of the wingman's aircraft was discovered on a 3500-foot hilltop near the area in which contact had been lost.

The Investigation

Although the exact cause was undetermined, the aircraft accident board considered the following possible causes—any combination of which could result in the loss of a pilot and an aircraft:

(*Continued on next page*)

LONG-RANGE, LOW-LEVEL

(Continued)

It was concluded that the wingman had exhausted the fuel in his external tank shortly after the rendezvous to penetrate the weather. The resulting loss of power and rapid shift from a fixed visual reference point (the other airplane) to instrument flying conditions could have caused vertigo. While fighting the vertigo sensation and attempting to restart the engine, a vapor lock may have formed in the fuel system. The apprehension caused by instrument conditions and loss of power combined to result in a rapid loss of altitude and the accident.

The Recommendations

The answers? The accident report and its endorsements make the following recommendations:

1. All pilots flying low-level navigation missions be thoroughly briefed on all weather that might be encountered.

2. When entering marginal weather a shift to the best main fuel tank be effected immediately.

3. Pathfinder aircraft should announce all weather to be encountered as soon as possible.

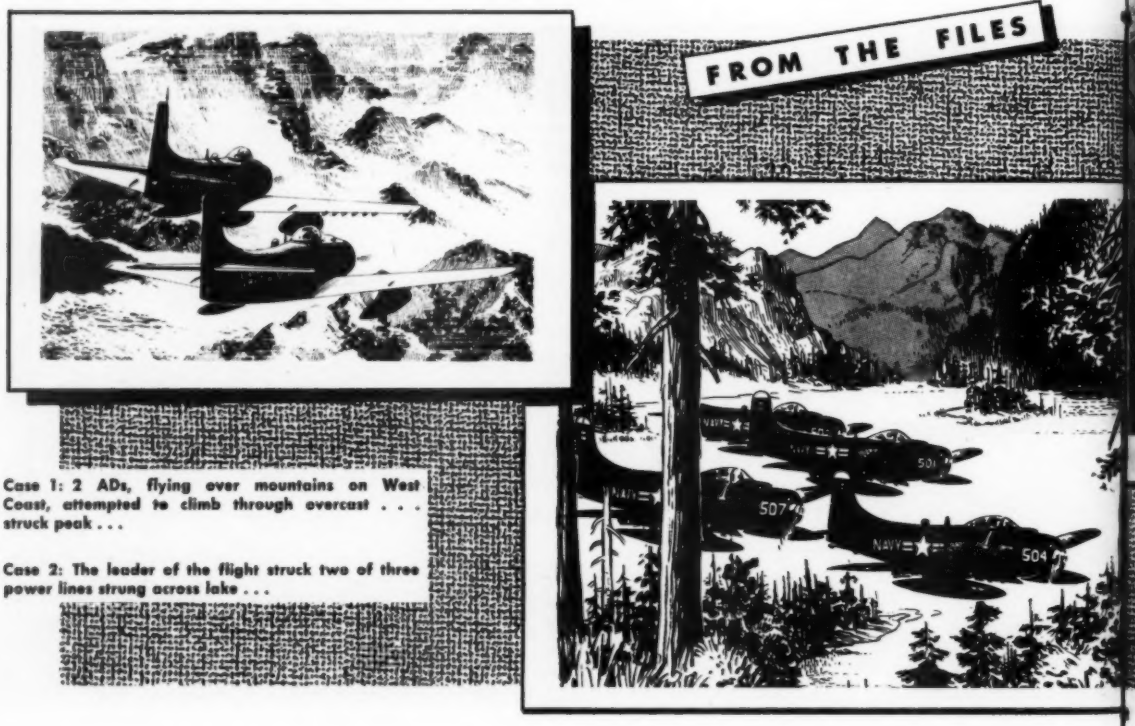
4. A prearranged weather flying procedure should be established and followed when two aircraft encounter instrument weather and become separated. Rendezvous should not be attempted until in a clear area.

5. All pilots involved in long-range low-level navigation flights should be thoroughly briefed, at least quarterly, by the flight surgeon on the physical aspects of long flying.

6. All pilots in training for this type mission should be given priority for instrument training, including weather flying, prior to deploying.

The Carbon Monoxide Threat

Of equal significance is the consideration of carbon monoxide poisoning, which factor becomes particularly import-



Case 1: 2 ADs, flying over mountains on West Coast, attempted to climb through overcast . . . struck peak . . .

Case 2: The leader of the flight struck two of three power lines strung across lake . . .

ant during extended periods of exposure. The observation is made that exposure to relatively small quantities of carbon monoxide at a low altitude could suddenly be aggravated by climbing to an altitude where blood oxygenation is reduced. (A discussion of carbon monoxide and its effects was presented in the *U.S. Naval Aero-Medical Safety Journal*, Vol. 1, No. 1, prepared by the Naval Aviation Safety Center)

Pilots should frequently be indoctrinated on the nature, symptoms and hazards of carbon monoxide poisoning. Whenever symptoms of visual impairment, progressive headache or flying difficulty occur, the pilot must immediately don oxygen mask and stay on 100 percent oxygen as long as practicable.

The Need for Doctrine

At the squadron level there is the continuing need for adequate doctrine which, for example, will provide for a separate climb-through in instrument conditions.

New pilots must be made to understand that the practice of the old hands stressing seemingly minor details stems from experience which is costly when learned individually. Sooner or later every pilot receives a first-hand demonstration that the philosophy of "it-won't-happen-to-me" is a fallacy which can be fatal.

For those charged with the planning and scheduling of training, there is a significant relationship between the aircraft accidents of this type and the lack of instrument flying experience of the pilots involved. Insure the safety of your long-range, low-level flight operations with a long-term, iron-clad policy of adequate training.

For the pilot, the squadron and the mission—these policies will pay rich dividends in lives saved, efficiency and effectiveness.

(*Continued next page*)

Case 3: Flight of two missed checkpoint, entered blind canyon. Wingman used flaps to climb out, pathfinder did not, crashed . . .

Case 4: Pilot's attention was diverted in cockpit . . . plane nosed down toward trees . . . power addition was too late. Aircraft mushed into ridge . . .

Aero-Medical Aspects of Long-Range, Low-Level Flights

Physical problems encountered on these flights include fatigue, headache, discomfort from cramped sitting, heat and perspiration. Flight surgeons who accompanied VMA-332 on low-level navigation hops had these recommendations:

1. Food on any hop of five hours or more should consist mainly of fruits and candy bars.
2. Thermos bottles should be refrigerated the night before the hop and filled just before the hop with ice and water to aid in keeping water cool.
3. Flight surgeons should provide kits containing dexedrine, APCs and salt tablets to be carried in each plane. At least one salt tablet should be taken during the hop as the pilots experience excessive perspiration. APCs are taken when required, for headache. Dexedrine should be taken at least an hour before landing, and may be taken as often as every four hours. (This blocks off the body's safety valve of fatigue, so it should be taken only as prescribed.)
4. Plenty of rest, and no alcoholic beverages should be the rule the night before the hop.
5. The pilot should not fly for at least 24 hours after his prolonged low-level hop. This time should *not* be used for practice for a track meet, doing the town or building a new house, but should be intelligently spent in much rest and general relaxation to give the body a chance to recuperate from strain.
6. Some type of rubberized horse hair or foam rubber cushion should be placed between the buttocks and the parachute as the pain and discomfort becomes quite severe.
7. If possible, in warm climates the start of the flight should be at about 7000 or 8000 feet for the first half-hour to cool off the plane.

Editor's Note: Fatigue factors of this type flight will be discussed further in a future issue of the Approach. *Safety officers and flight surgeons of attack units are invited to submit additional long-range, low-level doctrine and experiences to the Naval Aviation Safety Center.* ●

The Test Pilot Talks on

SPINNING THE TV

By Sammy Mason
Engineering Test Pilot
Lockheed Aircraft Corporation

THE TV-2 with the stall strip on the wing leading edge has excellent stall characteristics, and the erect spin characteristics in the normal flight training configuration are consistently good.

The spin characteristics are best with the landing gear and flaps retracted, tiptanks installed and empty, and ballast in the nose equivalent to the approximate weight of guns and ammunition. Of course if guns and ammunition are installed, the ballast is not required. Under these conditions the proper recovery procedure will stop a spin in a quarter turn.

Before getting down to the details of spin and recovery characteristics, I'd like to say a word about altitude. Most airplanes spin best at low al-

(Continued on next page)

Spinning the TV
(Continued)

titude where the air is heavy and rotational speed is slower. There is quite a bit of truth in the statement "that an airplane spins best just before it crashes."

Well, say what you will, I like lots of ground clearance when spinning these modern machines. About 20,000 to 25,000 feet is a good starting altitude for the TV-2. I personally would not recommend starting an intentional spin above 25,000 feet because the rotation will be fast.

The TV-2 is like any other conventional airplane for starting a spin out of a level flight stall. Push the rudder pedal and pull the stick full aft. The spin pattern may vary a little from one airplane to another and will be somewhat dependent upon the entry speed and rate at which the controls were moved to the spin position.

A rough entry, where the controls are abruptly placed into the spin position, may produce an oscilliatory type of spin with variable rotational speed and variable nose positions in relation to the horizon. The oscillations may vary with the nose high, near the horizon, to nose down near to or even slightly past vertical. These oscillations are nothing to become concerned about when the airplane configuration is as described previously. In general T-Birds will spin with the nose quite well down.

Chop That Power Off

One thing I haven't mentioned yet—and it is important—*don't leave power on.* Whether the spin is entered accidentally or for practice, the first act of importance is to pull the throttle back to idle position. Reducing power reduces the rotational speed.

The recovery procedure for the TV-2 is something like this: If the airplane is oscillating, wait until the nose is well down and apply full rudder opposite to the direction of spin and consider that the rudder is the only control that will stop the spin. For in the T-Bird, it is the only effective control in stopping rotation. Hold the stick full aft until the rotation stops, then neutralize rudder and release the back pressure against the stick.

So you don't like to hold the stick back that long. You figure that the stick ought to be popped forward long before the rotation stops. The truth of the matter is, I used to do it that way too, but I've learned differently. For good consistent recoveries, hold the rudder on until rotation stops, then release the back pressure on the stick.

In my experience with spinning airplanes, I have found that forward stick application too early will produce a speed up in rotation. In many airplanes, this speed up is momentary and is of no concern, but in some airplanes, like the T-Bird for instance, a rather fast rotating type of spin may develop.

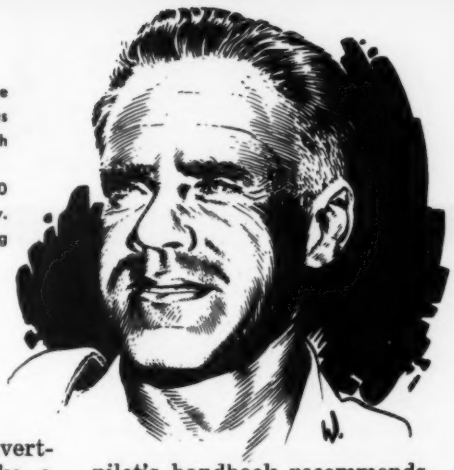
This type of spin can be stopped by moving the stick full aft, applying rudder opposite from the direction of spin and waiting until the rotation has stopped before back pressure is released. The stick should never be shoved forward abruptly during a recovery. For one thing it is a very good way to make the spin progress from erect to inverted.

Speaking of inverted spins, some airplanes actually spin better on their back than they do right side up, but the TV-2 is not one of these.

Intentional inverted spins in this airplane are to be avoided. As a general statement, it is easy to stop an inverted spin which has not been deliberately forced and allowed to

Sammy Mason joined Lockheed in 1950 as engineering test pilot and has done the stall and spin testing for several of Lockheed's fighters and trainers. So he was the logical man to prepare this article for the Approach on Spinning the TV, which was prompted by the suggestion of a CNATRA safety officer.

Mr. Mason's flight log includes more than 10,000 hours flown over the past 20 years. Readers may recall "The Hollywood Hawks," the famous aerobatic show. Under his guidance, this group established a remarkable safety record, touring the country for more than four years with no serious accidents.



progress. Should the spin be forced by placing and holding the controls in the spin position, which for an inverted spin is stick forward, considerable difficulty may be experienced in stopping rotation.

If an inverted spin has started, pull the stick full aft and apply full rudder opposite to rotation (these movements are done simultaneously). After rotation has stopped, neutralize rudder and release back pressure on the stick—then recover from the ensuing dive. Following this procedure will stop an inverted spin "right now."

I recall one particularly inverted spin in which I used wrong rudder in attempting to effect recovery, and I had done hundreds of inverted spins. Normally it is not at all difficult to determine rotational direction, but if you are experiencing difficulty in stopping the spin, give a little thought to the direction of the rudder relative to the direction of spin.

It is not difficult to recognize an inverted spin. Your feet will want to fall away from the rudder pedals and your hand away from the stick, not to mention that you will be hanging on your belt.

Now that we've covered the essentials of erect and inverted spins, you might like a word on the fine points of using aileron during erect spins. If the airplane feels as though it is skidding during the spin, a slight amount of aileron in the direction of the spin is helpful.

However, care should be exercised to avoid using too much aileron. Aileron against the spin retards recovery appreciably.

Stalls out of turns should never result in a spin. Release of back pressure against the stick at the moment of stall, plus minor rudder and aileron adjustments, will prevent a spin entry.

Watch Your Aileron Procedure

However, should an accidental spin develop from such a centrifugal maneuver, the rotational spin will be faster and the spin pattern may appear a little different. If the airplane appears to be rotating about the longitudinal axis such as in an aileron roll, some aileron against the spin will be effective in stopping rotation in addition to the rudder, but do not use aileron if the spin appears to be of the same pattern as that encountered when starting from a normal level flight stall. The pilot's handbook recommends neutral position of the ailerons. You'll never go wrong if you follow that procedure.

The gear-and-flap-down spin is not as good as the clean spin, consequently I would recommend that practice spins be performed with the airplane clean. With the gear and flaps down, the recovery procedure is the same and recovery should be prompt if not delayed too long.

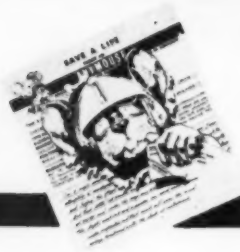
If recovery procedures are delayed for one reason or another, and the airplane response is slow, clean it up by retracting gear and flaps. Then use the normal procedures.

One final word:

I've never seen a book that described how to learn to balance a bicycle in motion. The same thing applies to spins.

The best way to learn is to get the actual experience. It is one thing to have the knowledge—and this is important; however, there is no substitute for trained reactions when it comes to flying.

Now, the T-Bird was built to offer the unquestionable advantage of instruction "on the spot," therefore I recommend taking advantage of instructor training. ●



ANYMOUSE and h

SUDDEN FEELING

"While returning in an F9F from a routine night section hop in fairly marginal weather I got separated from my section leader after pulling away to tune in my radio. The section leader decided to proceed home for bounce landings."

There was an overcast covering most of the area and Anymouse saw a plane letting down toward a hole. By radio he established it to be his section leader and they planned to rendezvous below the overcast for the return to base.

"I was still a good distance from him," continued Anymouse, "when at 10,000 feet he turned toward the base. After the turn I concentrated my attention on him and on occasional glances around for moving lights. I paid no attention to my altimeter.

"After I had been concentrating on the section leader's lights for a long time I didn't see anything wrong but I got a sudden feeling.

"Without even looking at my altimeter I pulled back on the stick and leveled my wings. A moment later my altimeter read 200 feet and going up!

"I called my section leader and told him I was discontinuing the rendezvous and proceeding independently to the base."

FILL 'ER UP

"I landed at an NAS en route to Pensacola and told the line crew to put 100 gallons in each tip. They did and I took off for Pensacola. Over

Tallahassee the tips went dry and I switched to leading edge tanks; they were empty! I then switched to the wing group and found they were empty!

"Made it into a nearby AFB with 25 gallons left in the fuselage tank.

"My mistakes were: (a) Didn't uncap and check all tanks prior to takeoff, (b) Didn't check my wing and leading edge group transfer prior to takeoff, (c) Should have told the line crew to gas her across the board plus 100 in each tip."

FRIGHT PLAN

On a night section tactics hop in an F9F–5, Anymouse and his wingman were caught by fast-moving weather which resulted in their home base going IFR. Communication difficulties prevented them from landing at several alternates and a dwindling fuel supply forced a decision to make a GCA at their home base.

"When I got back over the field that night," reported Anymouse, "my wingman said he had become separated and was not sure of his position. Since we both had established contact with GCA, I told them to bring him in first.

"I thought I had him in sight about a half-mile ahead on the same course that I was on. I began trying to catch him and when he hit the glide path at 1800 feet MSL, I was about 500 feet behind and closing rapidly. At this point we both entered the overcast and since there was danger of a collision due to our relative speed I made a hard left turn.

"I made this turn too sharp

and his hairy tales

Anymouse reports are submitted by Naval and Marine Corps aviation personnel who have had hairy or unsafe flight experiences. As the name indicates these reports need not be signed. The purpose of Anymouse Reports is to help prevent or overcome dangerous situations. Forms for writing Anymouse Reports are available in ready rooms and line shacks. All reports are considered for appropriate action. Send reports to the Naval Aviation Safety Center, NAS, Norfolk 11, Va.

and got into a highspeed stall. I couldn't think of anything except that there were a lot of hills about 1000 feet below and I didn't know how high the base of the overcast was.

"In my anxiety to recover, I pulled up too quickly and stalled again. This happened twice more before I was able to think properly and make a good recovery. When I finally got control and was able to look around, I found that I was below the overcast, flying straight and level, and headed directly toward the runway about three miles away. There was only about 300 feet between the ground and the overcast at the point where I did finally break out.

This experience proved three things to me: (1) never attempt a section GCA at night unless the wingman is really locked on tight, (2) never follow anyone into an overcast or cloud unless you are locked on tight, (3) if at low altitude and a stall occurs, make the first recovery a good one.

FLAT SPIN

While on a routine familiarization hop in an S2F-1, Anymouse was given a practice single-engine emergency at 6200 feet. A simulated carrier approach had been set up with airspeed at 85 knots, gear and flaps down.

After adding full power on the good starboard engine Anymouse found it impossible to hold the plane from yawing and it began spinning to the left. The throttles were both pulled off and normal recovery attempted with no response.

Recovery was finally accomplished on the second attempt by gunning the port engine. Straight and level flight was effected at 1700 feet. "It was a hairy spin," said Anymouse, "due to the flat attitude of the plane."

It was found that the trimmer switch was off, which was the main error committed, according to Anymouse. "I believe that immediately raising both gear and flaps would have aided recovery," he added. "It is very important that the simulated engine failure was done by pulling back on the throttle only, as we would have not have been able to recover if we had secured the port engine."

IT WAS ROUTINE

"I was on a routine pick-up flight in an F3D-2 and ready to depart for home base. After lighting off both engines I taxied to the takeoff position of an 8000-foot runway.

"*Preflight* checkoff list was completed and both engines run up to 100%. The starboard engine was a little slower coming up than the port and only indicated 99%. The starboard TPT was slightly higher than the port but not above max.

"There was a 10-knot crosswind from the right and on takeoff roll it was necessary to use almost full left rudder and some left aileron to keep the nose straight down the runway. Acceleration seemed slow but all instruments were normal except starboard TPT and as the runway temperature was 90-degrees I assumed it was due to the hot day.

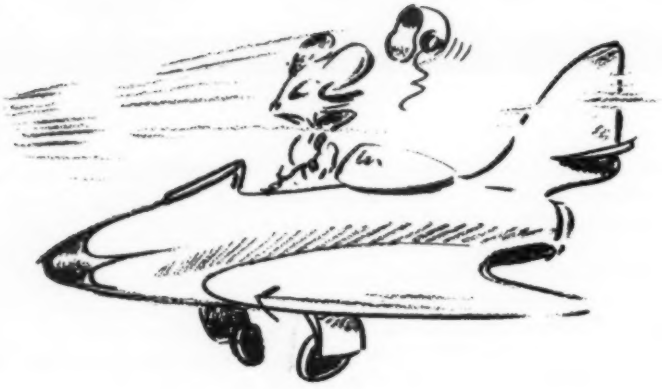
"It took approximately 7500 feet of the runway to become airborne with minimum airspeed. Climbout was very slow but there was no indication of a malfunction except that the starboard TPT was running somewhat higher.

"Upon landing the starboard engine was examined and the air inlet door was found to be a little more than half closed.

"I highly recommend that each pilot flying an aircraft with inlet doors make certain that the man on the line is instructed to visually check these doors before pulling the chocks."

(*Continued on next page*)

ANYMOUSE
(Continued)



CLOSE INTERVAL

"I was No. 2 in a flight of three F9F-6s returning to Moffett Field from Navy Crows Landing. We made a normal breakup over Moffett, but I caught up with No. 1 and was much too close to him from the beginning of the approach.

"I slowed to 130 knots in an effort to maintain or lengthen my interval between No. 1. I had about 20 or 30 degrees of turn left to line up with the runway and was at an altitude of 250 to 300 feet when I encountered vicious jet wash from No. 1. My left wing went down to an approximate vertical bank. The nose started down as the plane went to a vertical bank to the right causing the nose to drop further. I finally got the wings level and recovered at about 20 feet. I used 100% rpm from the time the wing first dropped.

"Hereafter I will initiate my wave-off as soon as I find myself with insufficient interval."

DO IT RIGHT!

After completing a local hop, the P2V in which Anymouse was navigator filed VFR to a nearby station to pick up a squadron pilot. Weather was hazy with an overcast and as the flight progressed, visibility became reduced to two miles with thunderstorms along flight path.

Over the field, visibility was under a mile due to a local thunderstorm and two missed approaches were executed before a landing was made.

"We stopped for our passenger," said Anymouse, "and asked for clearance back to our home base. The tower informed us that the field was then below VFR minimums, but if we expedited our departure we could leave.

"After a mag check we took off for home and again encountered visibility that was practically zero dead ahead, but good directly below. We were at 3000 feet on airways. I asked the pilot twice, by shouting across the cockpit, to file IFR from our present position. This he refused to do, so I made a formal request on the ICS to no avail. Later we did descend to 1000 feet.

"Upon approaching our home field, approach control reported the field was IFR, ceiling 600 feet with patches of fog. The pilot elected a range approach (range minimum 675 feet) instead of a GCA.

"The range was the loop type and in making the approach the pilot listened to his bird dog in the ADF position which gave him a false signal. The only way I was able to report low station passage was by spotting the bright red roof of the station as it went by, about a half mile to port. We broke out about one mile to the right of the instrument runway. The landing was without incident.

"We should have been IFR and made an instrument approach at our passenger stop. The tower at that field was equally lax in letting us continue on a VFR flight plan when the field was IFR. I recommend instrument instruction in safety of flight and *good common sense.*"

WANTS INSPECTOR

"I just happened to double-check my work on a 60-hour check of an AD-5N and found that the safety wiring on the sump plug had been done backward and that the plug was loose." Anymouse said further: "This could easily have resulted in loss of oil with subsequent seizure of the engine. I would recommend having one man in the check crew assigned primarily as an inspector of the work done."

FROM THE HEADMOUSE---

RE: STRAY AIRCRAFT

For the paperwork Anymouse who rightfully complained at the non-receipt of dispatches concerning his unit's aircraft, Headmouse advises that he checked up on the problem. The situation was discussed with the folks in Washington who are interested in such matters. BuAer assured that action is being taken on a new distribution list to take care of all stray aircraft held by various organizations.

RE: RUNWAY DUTY OFFICER

To Anymouse who is concerned over the question of responsibilities and authority of a runway duty officer, Headmouse offers the following discussion extracted from the minutes of a meeting of Aviation Safety Council, Southern (ComFairJax). The suggested procedure is regarded as largely responsible for a significant drop in landing accidents within that command.

(a) The officer runway watch, with two-way radio, pyrotechnics, lights and paddles is established for the primary purpose of preventing accidents by timely warning to pilots of planes in the pattern when danger exists.

(b) A most important gain derived by replacing the enlisted watch stander with an officer watch stander is that the officer is qualified to observe landing procedures and techniques and make written comments to the squadron commanders concerned when corrective action is in order. Such comments are not to be construed as "disciplinary reports" but rather are to be used as a tool for the overall improvement of techniques and field procedures.

(c) The watch stander is required to monitor the field frequency in order to comment on radio procedures being used and to keep himself constantly aware of the field activities.

(d) The transmitter is to be used only when emergency warnings are required.

(e) No change or shift of traffic control authority or responsibility has taken place as a result of this watch.

In expressing approval of this definition, Headmouse adds his belief that the watch is purely a safety device and has tremendous potential. Obviously, should the functions of the watch be discharged in a manner which creates the feeling that the watch is sitting in judgment or is posed as a standby accident witness, then its effectiveness will be reduced.

Note:

Headmouse feels that an AD pilot for example, is qualified to comment on a F8U landing which involved obvious skidding and which touched down two feet over the end of the runway lip. Such evaluation of basic fundamentals does not require extensive experience in model.

Headmouse extends his thanks and invites questions and comment.

RE: CANOPY POSITION

Anymouse's second query concerned the AF's canopy position during ground operations due to the dangers of carbon monoxide.

The provisions of T.O. 16–54 should be interpreted to mean that it is mandatory to have the canopy closed during all ground operations. However, pilots should realize that in close quarters they should taxi with the canopy open to prevent taxi accidents. Frequent or periodic tests for carbon monoxide in the cockpit should be made.

Airspeed at the cut was at least 10 knots too high.

VF F9F-6P

TOO FAST—Returning from a photo mission the pilot of an F9F-6P entered the carrier landing pattern. Leveling his wings in the groove he felt the plane accelerate and his altitude increased. He answered a high dip and the LSO considered the aircraft to be cut in a good position.

A normal rate of descent was commenced after the cut and the plane touched the deck between number 6 and 9 wires. It instantly bounced with the hook clearing all wires. A second touchdown was made just short of the Davis barrier which was engaged normally. The *Cougar* then continued into the barricade.

No malfunction of the hook system was found. The SPN-12 showed an airspeed of 136 knots at the cut which the accident board considered at least 10 knots above normal for the aircraft model.

Primary cause of the accident was the too-fast approach speed and the failure of the pilot to rotate the plane forward onto the nosewheel upon contact with the deck. A contributing factor was the cut given by the LSO at such a high speed that there was little margin for error in landing.

Reviewing authorities noted the necessity, when landing light and fast, of getting the nose over after touchdown or cut. Also noted were the useful results of speed information produced by the SPN-12 for LSO assistance.

ıthand Consequences

DIGEST OF RECENT AIRCRAFT ACCIDENTS

F9F-8

ABORT—After performing all necessary ground checks, two F9F-8s were cleared for a section takeoff. As they started rolling down the runway the wingman began dropping behind.

The wingman had previously used a particular runway intersection as a reference point to raise his nose gear prior to becoming airborne. Upon approaching the intersection the pilot noted his airspeed below the 120 knots required but began easing the nosewheel from the runway.

"My aircraft seemed to become airborne," he said, "then settled back onto the deck. The right wing began to drop, leading me to believe that the starboard gear was collapsing. I did not check the gear indicators."

Adding more back pressure in an attempt to break ground the pilot said he thought a partial power loss occurred. The plane settled again and the pilot retracted the gear to avoid cartwheeling should the starboard gear be collapsed.

With gear up and flaps down, the tailhook was dropped and the throttle chopped in quick succession. The plane engaged the emergency arresting gear and slid to a stop. Substantial damage resulted, however engagement of the arresting gear prevented additional damage.

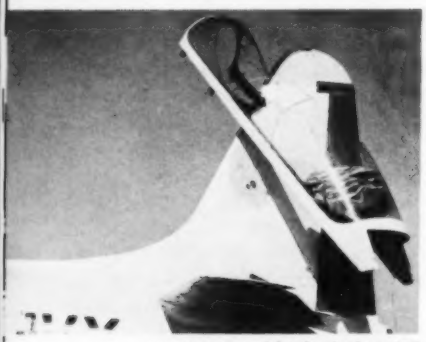
Following the accident the aircraft was turned up and found normal in all respects. Upon dropchecking, the landing gear was found to function properly.

A dual runway was in operation at the time of the accident and it was the pilot's first attempt at takeoff from the left-hand runway. Due to the physical layout, the runway intersection was reached about 1000 feet earlier than when taking off from the right-hand runway.

Recommendations included: (a) checking the wheel indicators when landing gear trouble is suspected, (b) that pilots avoid the use of runway reference points in takeoff rolls due to the many variables involved, (c) that the dangers involved in attempting to become airborne too soon during the takeoff roll in jet aircraft continue to be stressed to all pilots.

Using a visual reference point on takeoff got this pilot in trouble.

Truth and Consequences
(Continued)



Another case of inadvertent canopy jettisoning on the landing rollout.

VS S2F-1

LANDING WITH A LOAD—After being launched on a night ASW operation an S2F-1 returned to the carrier due to malfunctioning radar. The aircraft was carrying a heavy load of additional fuel but at the time of the carrier landing it was within the allowable weight limits.

During the approach, proper speed and altitude was held but the plane appeared slightly high at the cut position. The pilot noted that more power was needed because of the extra fuel load. "I took the cut and nosed over," he said. "Because of the impression of an unusually high altitude, I felt that if I didn't nose over a little steeper than usual I would get a very late wire and possibly a barrier. When I started to flare out I found the plane relatively unresponsive to the elevator forces normally used on a flareout."

Number 4 wire was engaged and the aircraft landed heavily in a flat attitude. Impact with the deck broke the axle of the port wheel and the plane rolled up the deck on the port brake assembly.

The accident board concluded that the primary cause of the accident was improper pilot landing technique and recommended that pilots be periodically re-instructed regarding landing techniques for S2F aircraft with heavy loads.

VT TV-2

FLIPPED HIS LID—Near the end of a landing roll the canopy of a TV-2 blew off and struck the vertical stabilizer as shown in the accompanying photograph, which unfortunately is not an isolated case.

The pilot stated that he had unlocked the canopy and at the same time the emergency release handle dropped down, jettisoning the canopy. It was found that during the pilot's preflight inspection the emergency release levers had not been checked for proper safety wiring. Safety wire similar to that used for safetying the lever was found on the deck of both cockpits after the incident.

Conclusion of the accident board was that the pilot actuated the canopy emergency release lever instead of the canopy lock lever and recommended that all pilots observe utmost caution in basic cockpit procedures during landing rollout. The flight handbook also states that the canopy may be opened for ventilation *after* turning off the runway.

NAS SNB

LANDING PROFICIENCY—The pilot had 267 hours in the SNB and had completed 16 landings in the past 11 months, three of them being in the last four months. Approach speed on final was about 85 knots indicated and as the field boundary was crossed a flareout was begun. The aircraft began to settle and dropped in from six to 10 feet with impact severe enough to rupture the starboard tire. Anticipating a bounce the yoke was forced forward causing the propellers to strike the concrete runway. Rollout was normal and after about 3200 feet rolling and taxiing the starboard tire went flat.

The accident board concluded that the error was aggravated by a lack of sufficient recent landing practice in model aircraft and proficiency in small field work. It was noted that if the aircraft is properly trimmed for landing, a release of back pressure on the yoke will help prevent the tendency to bounce. Power should be added to assist in landing when the aircraft bounces at slow airspeeds.

Increased landing practice during proficiency flying time was recommended by the board with the comment that no standard operating procedure will replace frequent practice in landings.

ZP ZP6-2

DRILL PRACTICE CHANGED—Because the elevator boost controls became disconnected a ZPG-2 was landed hard on its nose gear during the flare-out of the landing. The nose gear carried away and the radome scraped the ground.

Examination of the booster disconnects showed that all four had become disengaged from the control cables. They had been disconnected earlier in the flight to demonstrate the emergency control system for the purpose of crew training, but were reconnected except for safety wiring which could not be accomplished in flight.

It was determined by the accident board that since no provision is made for positively engaging the boost disconnects in flight, after having shifted from emergency control to normal control, the control system of the ZPG-2 model airship is defective.

Remedial action by the contractor was requested as a result. In addition, the accident board recommended that the practice of releasing booster disconnects in flight to be discontinued as adequate crew training can be accomplished by carrying out this procedure on the ground.

VA AD-4

DOWN, BOY!—After a hydraulic failure the pilot of an AD-4 lowered his gear by the emergency system. The AD was cleared straight-in to a 6500-foot runway and the pilot rejected the offer of emergency arresting gear.

With flaps up the aircraft passed over the end of the runway at 140 knots. Initial touchdown was 2000 feet down the runway in a tail-high attitude. The plane porpoised at least three times and after passing the 3500-foot marker stayed on the ground. Braking action was applied but had no apparent effect.

The ground dropped off sharply at the end of the runway and about 1000 feet from the end the pilot intentionally initiated a groundloop with hard left brake and rudder. Overhaul damage resulted from the maneuver.

In view of the runway length the decision not to use the emergency arresting gear was considered fundamentally sound. However the accident board found obvious errors in technique and judgement which reduced the pilot's chances for a successful landing.

It was noted that additional pressure on the brake pedals is necessary to obtain effective braking following a hydraulic failure, since power boost is ordinarily obtained from the main hydraulic system.

Corrective action by the command included a checkout of no-flap landings for new pilots and a program of periodic review and practice. Emergency checklists were prepared for all pilots which included information concerning proper no-flap approach and landing speeds.

AD-5N

CANOPY TROUBLE—During a practice glide-bombing run the starboard rear canopy of an AD-5N flipped open. It broke off and went aft over the port side causing damage to the port canopy and port horizontal stabilizer. After checking stall characteristics a normal landing was made.

It seemed probable that material failure of the locking system occurred though the accident board did not rule out the possibility that the hatch was not fully locked.

Other instances had occurred of rear canopies opening in flight. In all cases they came open as the front canopies were closed after takeoff, and were attributed directly to the fact that they were not fully locked prior to flight.

While there is no substitute for positive visual checking of the canopy by the pilot on his preflight, another cross-check is to follow this squadron's policy of making preflight turnup with the front canopies closed. Tests demonstrated that if turnup was made with front canopies closed and the rear canopies closed but not fully locked, the rear canopy will usually pop open partially and then vibrate excessively, thus giving advance warning of an unsafe condition.

However, if turnup is made with the front canopies open, the rear canopies generally stay tightly closed even if not fully locked.

(*Continued on page* 26)

Presented here is a free translation of a hieroglyphic-inscribed fragment of papyrus recently uncovered by archaeologists probing the secrets of a previously undiscovered tomb-vault bearing the symbol "BuSlaves—No Admittance Except to Authorized Pharaohs." The exact date of the writing is unknown, but the vault is believed to have been constructed during the dynasty of a little-known ruler named Comfairwestpacjap.

Cantedeck Tales

AND so it came to pass, as the fourth hour before dawn approached unto the land known as Chosen, a messenger goeth forth into the bunk room of the birdmen, and he speaketh unto each saying "Arise ye and don thy poopy suit, and go ye to the briefing place, for the leader has decreed that it shall be thus."

The birdmen awakening, revile the messenger and cry out saying his mother was afrighted by an alarm clock salesman, that his father knoweth him not. And they bestir themselves and seek out their socks and go forth to break bread, and one breaketh his hand on the bread.

Then did they gather together in the sanctums, known as briefing places, and their voices are hushed, for they are in the presence of their leader. And so it came to pass that apprentices did arise and speak unto them, telling of routes, altitudes and targets, for such is their manner of speaking. And at last the leader ariseth and sayeth unto them, "Yea, verily, thou art indeed fortunate this day, for thine enemy is sorry put and does naught to oppose thee. Go ye forth and gird thyselves for battle."

And the birdmen did whisper one to another, "Yea, this will indeed be a day of great tribulation for the leader retireth to his sack and goeth not amongst us."

The birdmen go to their iron birds and prepare their rituals. And some are sore beset by trembling and redness of the eyes, having par-

taken too freely of wine, and they seeketh out their friends and speak unto them saying "Yea, buddy of mine, have I not many times been a brother unto thee? Therefore wilt not thou take my place in battle this day, for I am indeed overtaken by illness?" And their friends answereth saying, "Thou soundest faint and I cannot hear thee."

And so they go forth and there ariseth a mighty clamor as the great birds soar into the air. And the birdmen proceed unto the land of darkness, even to the doorway of the evil one called by name, Joe.

Then the skies become dark with mist and the birdmen stray one from another and do miss their turning points and are lost. And they find not their targets, and great is their trepidation. And the birdmen call out one to another saying, "Childplay One, come thou unto me, for I am set upon by bandits and my flame goeth out." And Childplay One replyeth, "Verily, thou shouldest drop dead, for my wings grow heavy with ice and the flak hath found me."

And some falleth into the land of darkness, while one and another scurryeth like mice, and salvoeth their bombs into the sea, and returneth home empty handeth and shooketh.

And the leader gathereth them together and speaketh harshly to them of the bad show and of many practice missions and of frozen promctions, and giveth them h— in general. So be it.

As the ball bounceth, so goeth our fortunes, but the wise pilot controlleth the bounce with shrewd use of aviation safety english.
—(*Old aviation proverb*)

Truth and Consequences
(Continued)

Following an actual GCA which pressed the minimums the plane struck the runway in a starboard wing-down position.

VP P2V-5

PRESSING GCA MINIMUMS—Weather at the northern overseas station was reported below GCA minimums with 100-foot indefinite ceiling and three-eighths mile visibility in light drizzle and fog.

A P2V-5 had made one missed approach and commenced a second GCA immediately. There remained adequate fuel for this second attempt before the aircraft was forced to depart for the alternate, 700 miles east.

The copilot was in the left seat and the plane commander allowed him to make the GCA to the point where visual contact was established. The second approach was normal though turbulence on final caused the plane to go above the glide path. Corrective action was taken and when passing through GCA minimums the PPC believed the plane would be lined up.

Upon sighting the runway the PPC noted they were slightly to the right and a correction to the left was required. However he felt the aircraft was in a good position to land, took the controls and began a turn. Nearing the centerline he made a right turn to line up with the runway. To correct for drift the right wing was lowered.

The pilot made what he considered a normal touchdown even though the final rate of descent had been higher than normal. However the plane struck the runway in a starboard wing-down position of about 15 degrees and the right main mount gave way. The wingtip tank and main mount had contacted the runway at the same instant, then fire broke out.

Burning furiously, the aircraft continued down the runway and came to rest after about 835 feet of travel. The crew had been in their assigned ditching stations using proper safety equipment. No injuries were sustained and the plane was successfully evacuated.

In analyzing the accident the board stated the primary cause was the pilot's attempt to correct to the runway without adequate altitude and concluded that a missed approach maneuver would have been proper.

Though the GCA controller wrongly indicated that the plane was within the runway boundaries, the accident cannot be attributed to GCA error. Upon reporting visual contact the pilot attempted a landing.

Pilot attitude was considered as a contributory factor as the crew was to depart for the States in three days after completing an overseas tour. The possibility that this departure would be delayed as a result of proceeding to the alternate may have influenced the pilot's decision to press GCA minimums.

Recommendations by the board included more stress on the dangers inherent in violent maneuvering in the limited airspace available at GCA minimums. Controllers should not hesitate to give wave-offs when the weather is at or near minimums. They should also advise the pilot if the aircraft is not on the centerline at minimums. ●

AERO-MEDICAL

SECTION

For the latest on High Altitude Ejections from your flight surgeon, please turn the page. You and your aircrewmen might get home quicker some day with the tips on page 32.

HIGH ALTITUDE EJECTION

A successful high-altitude ejection starts on the ground, before every flight.

The standard operation is to remove or stow loose excess gear which might clobber you

when you go out. Make very sure your bailout bottle is connected and that the strap on the oxygen mask is attached to your parachute harness, not to some portion of the plane or seat which you are going to abandon reluctantly or otherwise.

Of course you know each and every ejection step for the particular type sky-flyer you are bounding off in, or you would not fly it—would you? You know the trick of rehearsing ejection procedures instead of counting jets when you can't sleep.

Prior to Ejection

You know your emergency procedure — and this is the emergency!

Prior to the ejection . . . Slow your plane if possible. Your chances of survival are greatly reduced above 600 knots. Check that bailout bottle connection, even though you checked it on the ground, because oxygen is going to be the most important thing in your life, and to your life, for the next few minutes if the ejection is accomplished much above 20,000 feet. If time permits remove all unnecessary gear such as clipboard, kneepads and computers.

Remember the jingle, *Pre-PosOxPull.* Actuate the *pre*-eject device if your plane has one. *Pos*ition yourself correctly for the seat you are in, being sure your elbows are close to the body. Actuate your *ox*ygen bailout bottle. *Pull* the face curtain with palms in —thumbs out.

With the Seat

Now you're out, you will probably be tumbling, and you are going mighty fast.

That face curtain will prevent wrinkles in your complexion and will keep your headgear and oxygen mask with you until you decelerate.

As soon as possible after ejection release your safety belt. You would have a faster, quieter, but not nearly so healthy a ride by staying in the seat.

(*Continued on next page*)

There's more to high altitude ejection than
PrePosOxPull. Check this new information
on the all-important follow through.

You are now clear of the seat, free-falling at your terminal velocity.

Free Fall

You will want to continue to free-fall for several reasons. This was a high-altitude bailout. The atmosphere is cold, the pressure is low, your velocity is high, and the only oxygen available is in your bailout bottle which is not expected to supply oxygen for a long open parachute descent.

Your terminal velocity is dependent on your mass and the density of the air, therefore terminal velocities are greater in the rarefied air at high altitudes.

The opening impact of a chute under these conditions could easily be 33 G or more. These forces diminish rapidly with descent to lower altitudes.

A parachute descent from 40,000 feet for instance would subject a pilot to below zero temperatures (as low as—67° F) for 9½ minutes, with resulting severe frostbite. Combine this with loss of oxygen during the descent and he would have little chance of making a controlled and successful landing.

In a series of laboratory tests in which a loss of consciousness was produced during simulated free fall starting from 36,000 to 30,000 feet, all subjects recovered sufficiently to pull the ripcord between 25,000 and 2200 feet; the average pull being made at approximately 14,000 feet.

High Ejection—Oxygen

Similar tests show that such a descent can be made without loss of consciousness and without supplementary oxygen, if a deep breath of oxygen is taken just prior to the start of the descent and held for as long as 30 seconds. This, of course, may not be practical in actual ejection type bailouts because of the forces and action involved.

However, it is obvious that oxygen, if available, is a tremendous safeguard. *It may be available even though you lost your mask.* Just put the end of the bailout bottle tube in your mouth and breathe. This tube will disconnect at the oxygen hose connection point.

During actual bailout at high speed, a pilot may experience a brief period of unconsciousness but his chance of avoiding it, or at least shortening its duration, is assisted by the use of the bailout bottle during escape.

It is important to remember that in sudden exposure to high G-forces there is no blackout period; rather if the force is great enough, unconsciousness occurs without warning.

Parachuting

After you have free-fallen to 10,000-5000 feet, pull your ripcord and follow standard parachuting procedure. Most aviators will be able to recognize the 5000-10,000-foot level from experience with the relative size of familiar objects. However, if you miss this cue, at about 2000 feet you will become aware of the sensation of falling which is not apparent above that altitude.

Above 50,000 Feet

Ejection above 50,000 feet should not be attempted if there is any possible alternative. Ejections above this altitude will require pressurization in the form of a pressure suit with oxygen supply, or an ejection capsule.

Editor's Note: This article prepared as the result of a request by VC-3. Other units are invited to suggest topics they would like to see discussed in the Approach. ●

NOTES from your flight surgeon

OVER AND BACK IN TWO MINUTES FLAT

This F9F-6 made a normal carrier approach and landing. The tailhook engaged, but then broke at the tapered portion of the hook shank. The right wing hit the Davis barrier stanchion and island, and hit the Tournapull head-on. Then it seemed momentarily to stop.

The pilot thought of fire and started to reach for his safety belt, but noticed he was still moving. The plane went over the side and the pilot remembers next being underwater inverted. He remained in the cockpit until the bubbles receded, took a couple of breaths of oxygen and left the aircraft.

He was picked up by helicopter. The estimated time from cut until he was back on deck is two minutes.

He said, "My shoulder harness and seat belt were pulled tight and I think that was the single major safety device that kept me from being seriously injured when the plane hit the island and plunged into the water. My reactions in the water seemed to be automatic and I figure that my safety and survival training, (Dilbert Dunker) paid off."

HYPERVENTILATION?

The F9F-5 pilot was flying under the hood on an IFR training flight. He gave an incoherent answer when the chase pilot called him, and flew into the ground.

Investigation revealed that his family felt he was extremely upset over the fact that he had an instrument test coming up. It was not determined whether his concern was over the written or the flight test. He was not noted to be depressed by his squadron mates. However, in view of the incoherent radio transmission plus the fact that he made no effort to pull the instrument hood off or eject himself, there is little doubt that he was in some way incapacitated.

Of the many factors which might incapacitate a pilot, hyperventilation is definitely one to be considered. It could easily account for this accident. The preceding anxiety associated with the actual flight test would be adequate to initiate the process, which would in turn have caused the unconscious state which followed. For more information on hyperventilation, see the June 1955 issue of the U.S. Naval Aviation Safety *Bulletin.*

EAT, DRINK AND BE MERRY . . .?

Restrain your convivial enthusiasm, gents, particularly for the "drinking" in "Eat, Drink and be Merry . . ." For regardless of how much or little you drink, alcohol is eliminated from your system at the rate of only one-third ounce an hour.

So it takes 12 hours to get rid of all the alcohol from half-a-dozen good highballs. *Five 12-ounce bottles of beer have even more alcohol.*

Consider smoking, too. Half the carbon monoxide from smoking, or any other source, will leave your blood stream in one hour, but it won't be completely gone for eight hours. Five percent saturation equals 8000-10,000 feet of altitude. Three cigarets equal four percent saturation . . . You figure it out.

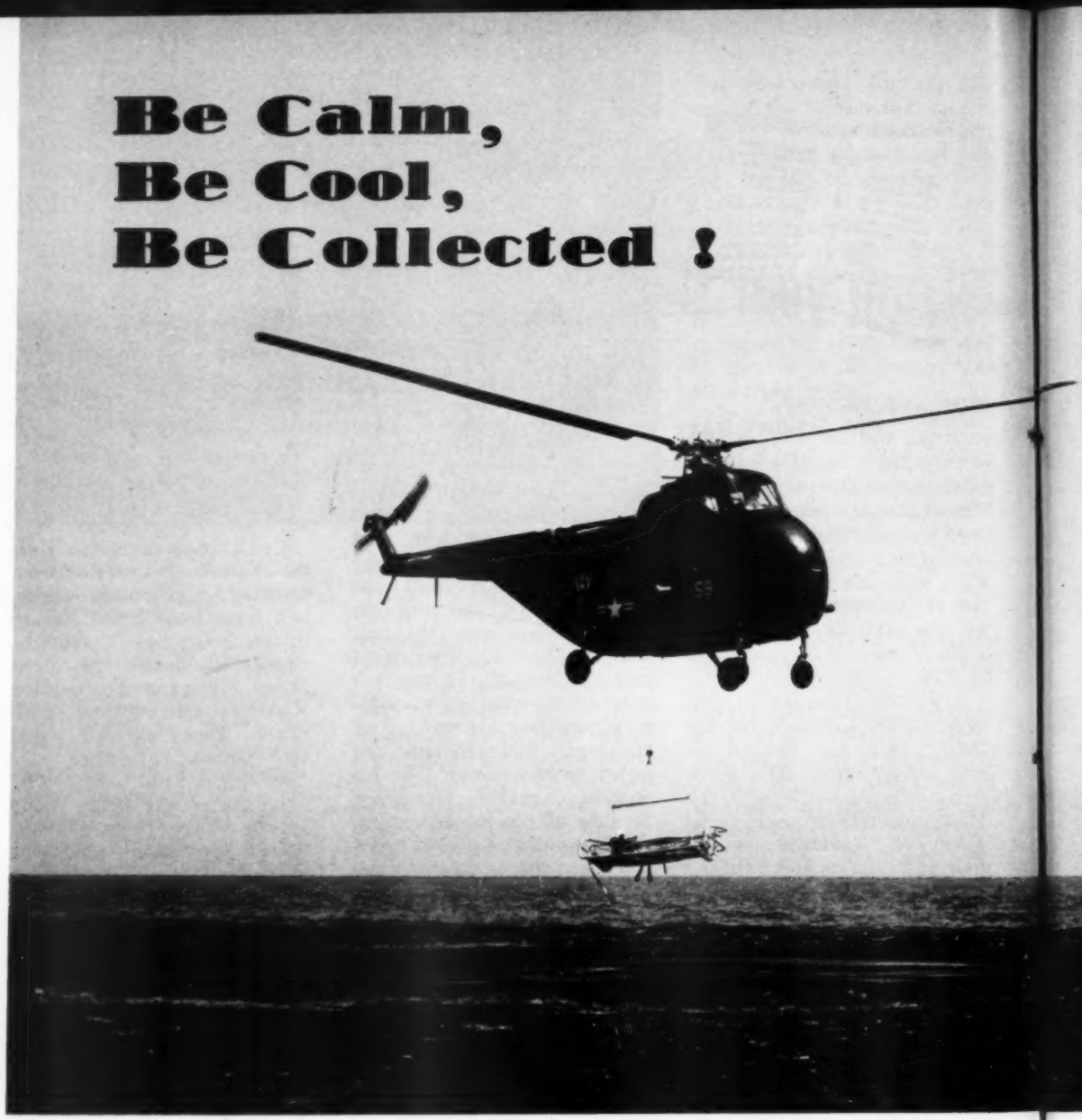
So better say "Eat, drink and be merry (with moderation)—day *after* tomorrow we fly!

TESTIMONIAL

It was his first solo and he let the TV-2 get too slow, added power too late, and settled into the water, demolishing the plane. Injuries? Minor!

The flight surgeon stated, "I think the minor extent of his injuries is worthy of note as he actually cartwheeled when he dipped the wing, and the aircraft practically disintegrated with the exception of the center section. This is a prime example of the effectiveness of the standard safety equipment." ●

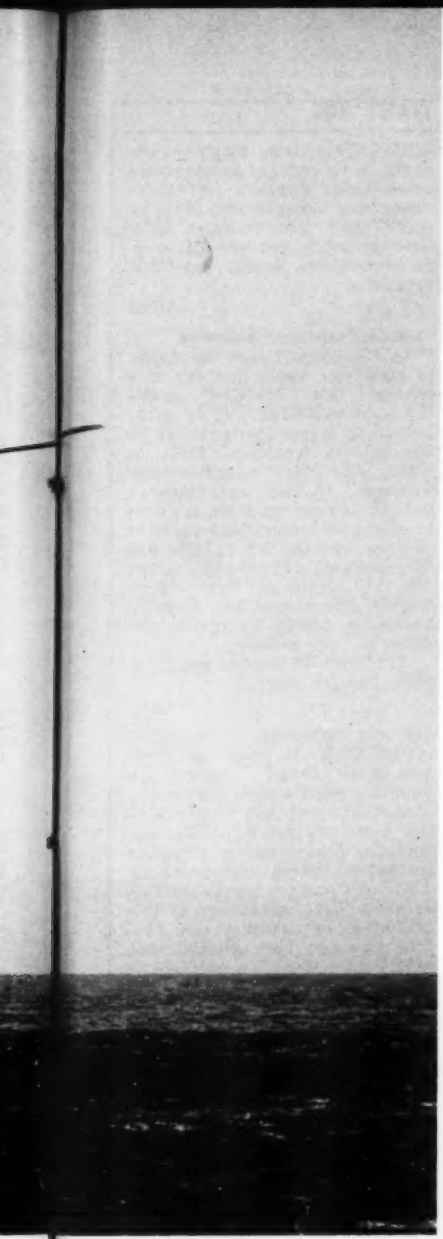
Be Calm, Be Cool, Be Collected !



Let's say you've just made a small splash in naval circles—like for instance you ditched or ejected — and now you're bobbing around confidently as the 'copter comes in for the pickup.

But, steady boy, you aren't rescued yet. The next few minutes can be confusing unless you have an idea of the helicopter pilot's recovery techniques.

"Well for Pete's sake! Why is he putting the sling down over there? He must have lost sight of me . . . Now he's backing away from me. Hey, you



sadist! Over here!"

Such various uncomplimentary comments will sometimes result from the apparent erratic actions of the "angel of the fleet" but there is a reason behind each of these disappointing actions.

Hoist

One of the necessary features of the rescue helicopter is the hydraulic hoist. This provides a means of making a hovering pickup to get a survivor into the helicopter cabin in a very short time.

In the HUP model helicopter the hoist is directly over the rescue hatch in the cargo compartment. It is designed to lift 400 pounds. It is driven by a hydraulic pump on the engine. The pump operates continuously all the time the engine is running. The hoist is provided with a 100-foot cable to which a sling, hook, chair, litter or net can be attached. It can be operated by a crewman or the pilot can control the vertical motion from the cyclic control stick.

For standard rescue work a device known as a sling is attached to the pickup end of the hoist cable. One sling in use, particularly in transferring personnel, is simply a closed belt approximately three feet in circumference. It is attached to the hook at the end of the hoisting cable by a D ring, and is lowered to the survivor who slips it over his head and under his arms. Its principal advantage is its simplicity.

A newer type of sling is easier to put on and will not come off while the survivor is being hoisted even though he may lose consciousness in the meantime. This sling is filled with kapok. It floats, and is more comfortable to wear than the former belt. Yet it is rigid enough to exert pressure against the survivor's body so he cannot slip through. It is also equipped with a safety belt which can be secured around the victim's chest.

If the hoist should fail, the helicopter crew is prepared to tie a sling to the end of the cable or manila line so the survivor can be picked up and dangled until he can be landed ashore or on the deck of a ship.

In crash and ditching emergencies the plane guard destroyer and the helicopter both proceed immediately to the scene, the rescue being handled by the first to arrive.

Ships Maneuver Downwind

If the helicopter is the first rescuer, it is essential that ships in the vicinity stand by in a position well clear of the rescue maneuvers. The ship movement which appears puzzling to the survivor may be explained by the realization that ships should stay downwind, and avoid lying-to or crossing too close upwind of a hovering helicopter. Otherwise turbulence or blanketing of the wind may present a real danger to helicopter hovering requirements.

Rescue Procedures

When making a rescue the whirlybird should approach the survivor into the wind. Altitude is approximately 35 feet—high enough so that the person to be rescued can be kept in sight at all times.

The sling is lowered into the water in an area away from the crash to prevent possible ignition of fuel on the

(*Continued on next page*)

(*Continued*)

water due to static electricity. The hoist sling may be partially lowered as the helicopter approaches the man to be rescued. Just over the survivor the sling is placed as near him as possible; then the helicopter backs away slightly to enable the pilot to keep the scene in view. When he is certain the survivor is in the sling and ready to be hoisted aboard, he gets an okay from the crewman or survivor, and hoisting begins.

You can speed your rescue from the cold water or snowy plain once the helicopter arrives if you know how.

Without a crewman, it is almost impossible for the pilot to effect a rescue alone. He is able to control the hoist, but has the problem of attaching the sling and bringing the injured man into the cabin. In practically all cases, the rescue mission is begun with the expectation that the survivor will be able to help himself into the sling. If he is not able to do so the helicopter pilot must consider sending the crewman into the water to make the rescue.

Immobile Survivors

If the survivor should prove to be immobile, the crewman fastens himself to a point on the hoist cable by means of a cable grip (a friction hook) and his sling, and is lowered by the pilot to assist the man in the water. The pilot reels out a cable length equal to three times his altitude. The crewman releases a dye marker, inflates the survivor's life jacket and puts the man into the rescue sling, securing the sling safety belt.

He then threads about 30 feet of cable through the grip, and signals his readiness to the pilot who returns him to the helicopter with the hoist. The crewman then detaches his grip from the cable, and completes the rescue.

And there you are, safely back aboard, to shrug modestly over your latest accomplishment and to make the usual complaints about the quality of the whirlybird service not being up to snuff.

Yessir, it's a great life, and a nice long one too, if you make it your business to know the procedures that made angels out of helicopters. ●

WANT ADS

WANTED—Alert, aggressive naval aviators to demonstrate established product. Previous experience unnecessary. Must be unwilling to take chances. Lifetime security guaranteed. Address Aviation Safety, care this magazine.

(Adv.)

BARGAIN! BARGAIN! BARGAIN!

PILOTS—Here's just the thing to keep you warm and dry this winter! Our "Marilyn" model exposure suit (Mk. IV) is guaranteed to warm and comfort in the coldest weather. Built to rigid U.S. Navy specifications. Through special arrangement with the government we are able to offer this tremendous value to you for just the asking! So ask for, demand, and always use the Mk. IV Exposure Suit! Your supply officer now has them in becoming colors to match the decor of your setting.

Act now! This offer won't expire, but *you* might!

(Adv.)

YOU PAY NOTHING!

AVIATORS—Is your old oxygen mask dirty? Leaky? Do your fingernails turn blue in the blue? Are you left breathless? See your nearest OH-TWO authorized dealer for a complete inspection, check and overhaul. You don't pay one penny for this service. Take advantage of this unlimited opportunity *now*, before you pay through the nose later! (Adv.)

PERSONALS

J.G.: Please try to see it my way and get a new slant on things. If you think you can make a pass at me like that you don't know me very well. I'll be at the same old place in case you decide to come around with the right attitude.

—L.S.O.

I.F.R.: Why didn't you call? We wanted so much to hear from you when you passed by, but not a word. We don't know if you're alive or not. It's too late for forgiving now. A.T.C. knows everything. Skipper is unhappy over you too.

—C.A.A.

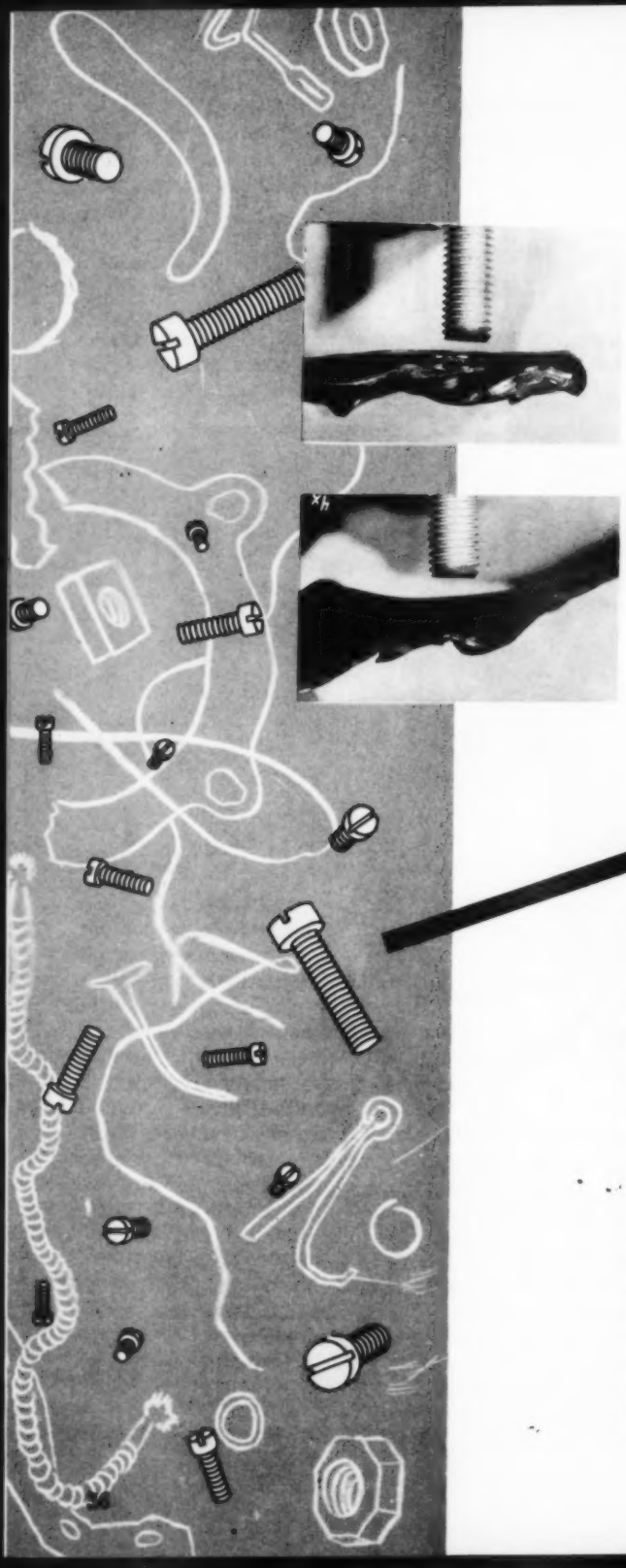
A.D.C.: Come home. All is forgiven. You are innocent. You-know-who confessed that he left the you-know-what up when he came in for a W.U.L.

—X.O.

MAINTENANCE

SECTION

Objects adrift in and around aircraft operating areas pose one of the worst jet engine maintenance problems yet faced. It takes effort on the part of all hands to minimize this dilemma. Please turn the page and read about what is happening—and what *you* can do to help!



Foreign Object Damage

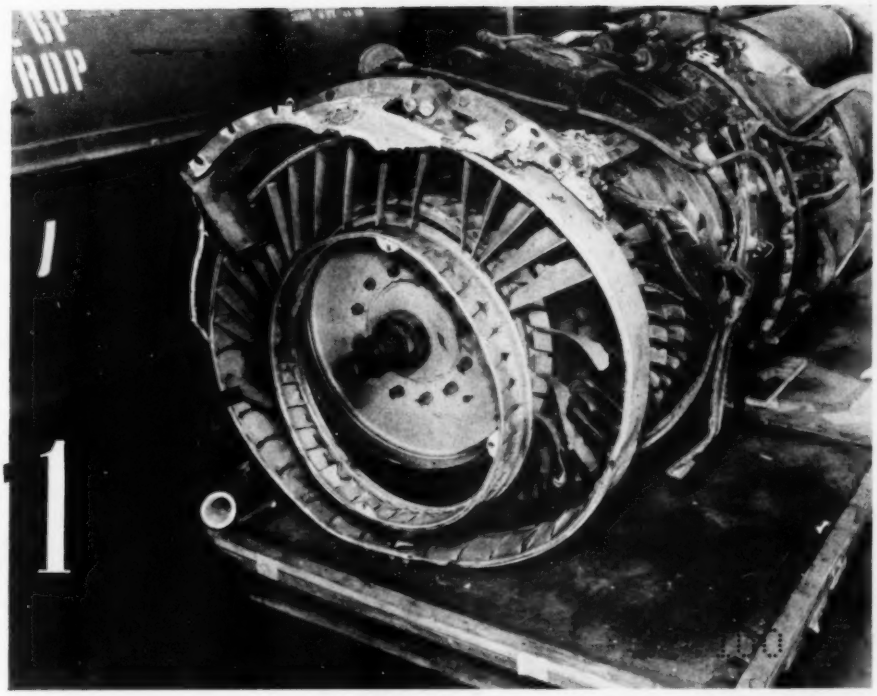
Jet Engine Enemy

Nearly one-third of our jet engines are failing to live out normal life expectancy because of foreign object damage. According to the Bureau of Aeronautics 105 out of a total of 371 engines went to overhaul prematurely for this cause during a recent 3-month period.

In addition to a costly loss in engine service resulting from this cause there is the ever-present threat of fire and explosion during jet-engine operation. Foreign object damage is considered one of the more serious problems facing naval aviation maintenance people today.

When dense objects accidentally enter the air intake ducts, extensive damage is inflicted on turbine engines. An explosive failure of the compressor is usually the result. Even an object as small as a rivet may shatter a compressor blade revolving at tremendous speed or nick it and cause fatigue failure of the blade.

The majority of foreign objects identified



No. 1

The J-47 engine of a *Fury* was wrecked by a foreign object. Thread marks found on the blades revealed the identity of the culprit (photos at left).

have been bolts, nuts, screws, washers and tools. Some damage has also been caused by stones, sand, foil, sticks and rags. Over 90 percent of the foreign objects causing damage are blown into the air intake ducts by propeller wake or jet blast of another aircraft during runup, taxiing or at takeoff.

Jet engines can and do pick up foreign objects from the cracks and joints of our concrete runways and taxiways with the exasperating indifference to possible harm of small children putting assorted trash in their mouths. This was proved in tests conducted by the National Advisory Committee of Aeronautics.

Engineers of NACA's Lewis Flight Propulsion Laboratory at Cleveland, in a study of "Ingestion of Foreign Objects into Turbine Engine Vortices," reported among their findings that vortices formed by the suction of jet engines picked up pebbles and small rocks. The vortices were reported to be most prevalent when engines are operating at 50 percent power or greater. It was noted that objects lodged in cracks seem to be more susceptible to lift than objects lying free on the pavement surface, possibly because the vortex movement does not sweep them aside as it passes over them.

Obviously, then, sweeping alone of these areas is not the answer. Sweepers push objects into cracks and joints. This factor, coupled with the inability of magnetic sweepers to pick up non-magnetic material, leads us to only one apparent solution—that is, inspection and policing of these areas *after* sweepdowns.

Areas containing a large number of cracks should be hand-swept. So serious is this problem of damage to aircraft by foreign objects that at least one major naval air station has instituted a practice of inspecting its ramps,

(*Continued on next page*)

(Continued)

runup areas, taxiways and runways twice daily.

In addition to clean groundskeeping, good housekeeping in the nature of clean aircraft is also essential for safe, less costly aircraft operations. The structure forward of air intake systems should be free of objects which could possibly loosen and be sucked into compressors. Inspection doors and removable panels should be fastened properly to eliminate any possibility of their loosening or falling off. The same can be said of rivets, screws, nuts and bolts. Airframe or engine mounted inlet screens, primarily designed to safeguard personnel, are not adequate in keeping out small objects.

Post-maintenance inspections should be thorough to preclude loose and foreign objects around and in engines and airframes. Don't overlook safety wire clippings, cotter pins, tools, flight gear or anything else that may be left in the aircraft that doesn't belong there. Besides harming jet engines these objects have been known to cause jamming of flight controls!

Safety officers might do well to follow examples set by aircraft manufacturers who use poster presentations illustrating both the need for clean practices and the consequence angle of accidents caused by foreign objects. The problem is one that requires the indoctrination of all hands, particularly in using discretion before discarding debris.

Cigaret packages, rags, candy wrappers, though seemingly harmless have blown onto the runway only to be swallowed up by a jet engine for a severe case of jet "indigestion" and possibly a serious accident. This kind of accident is avoidable and is therefore a needless drain of our defense dollar$.

The solution to the problem of foreign object damage appears to be in the application of an aggressive training program for all hands stressing cleanliness, which must begin at the command level.

What can you as an individual do about it?

"Miking" stator blades in a jet engine compressor casing. The casing covers the compressor rotor whose blades whirl between the stator blades at thousands of RPM—clearances here are critical. —Photo courtesy of NACA.

If you're a pilot

- Don't let your flight gear get adrift.
- Maintain adequate spacing and avoid taxiing or takeoff in jet blast or prop wake of other aircraft.
- Demand a clean airplane.
- Help keep it clean.

If you're ground crew

- Pick up tools and equipment when the job is done—use a tool checkoff list.
- Keep screens over the intake ducts whenever possible.
- During preflight inspect the turbine most carefully—good light will help.
- Clean that airplane.
- Keep it clean, keep it clean!

All hands

- Don't throw objects away carelessly—remember there's a place for *everything*.
- Be careful that nothing falls out of our pockets or can be drawn from them into the intakes. Be especially careful that *you* don't get *sucked in*.
- Whether you're on a ship or station, help KEEP IT CLEAN! ●

From the Ground Up

Notes and Comments on Maintenance

DROPCHECKS failed to find the fault.

DROPCHECKS WERE NOT ENOUGH—Three successive landing gear discrepancies on an F2H-4, which were written off as "dropcheck satisfactory," contributed to a landing accident in which the nose gear collapsed.

Before landing the pilot placed the gear handle DOWN. The main left gear and nosegear indicated DOWN and LOCKED, right main gear UNSAFE. Recycling of the gear did not correct the situation so the pilot raised gear, pulled circuit breakers, lowered gear handle and then actuated the emergency system. This action produced a DOWN and LOCKED on both main gears and an UNSAFE indication of the nose gear.

The pilot held the nosewheel off the ground during the rollout but when the tailhook engaged the emergency gear the nosegear collapsed. Damage to the aircraft was minor.

The O ring seal in the nosegear assembly had deteriorated and emergency air pressure was lost, preventing nose gear extension under in-flight conditions. Earlier discrepancies were attributed to a corroded right door open limit switch. A break in the casing caused by a previous overtravel of the plunger allowed water entry and corrosion. As a result normal extension of the landing gear was erratic.

The accident board said the pilot erred in not following F2H-4 handbook instructions for emergency operation of the landing gear. Had the pilot pulled the circuit breakers on both the left main and nose gear when they were down and locked and then used the emergency system to free-fall the main gear into place, the accident would not have occurred.

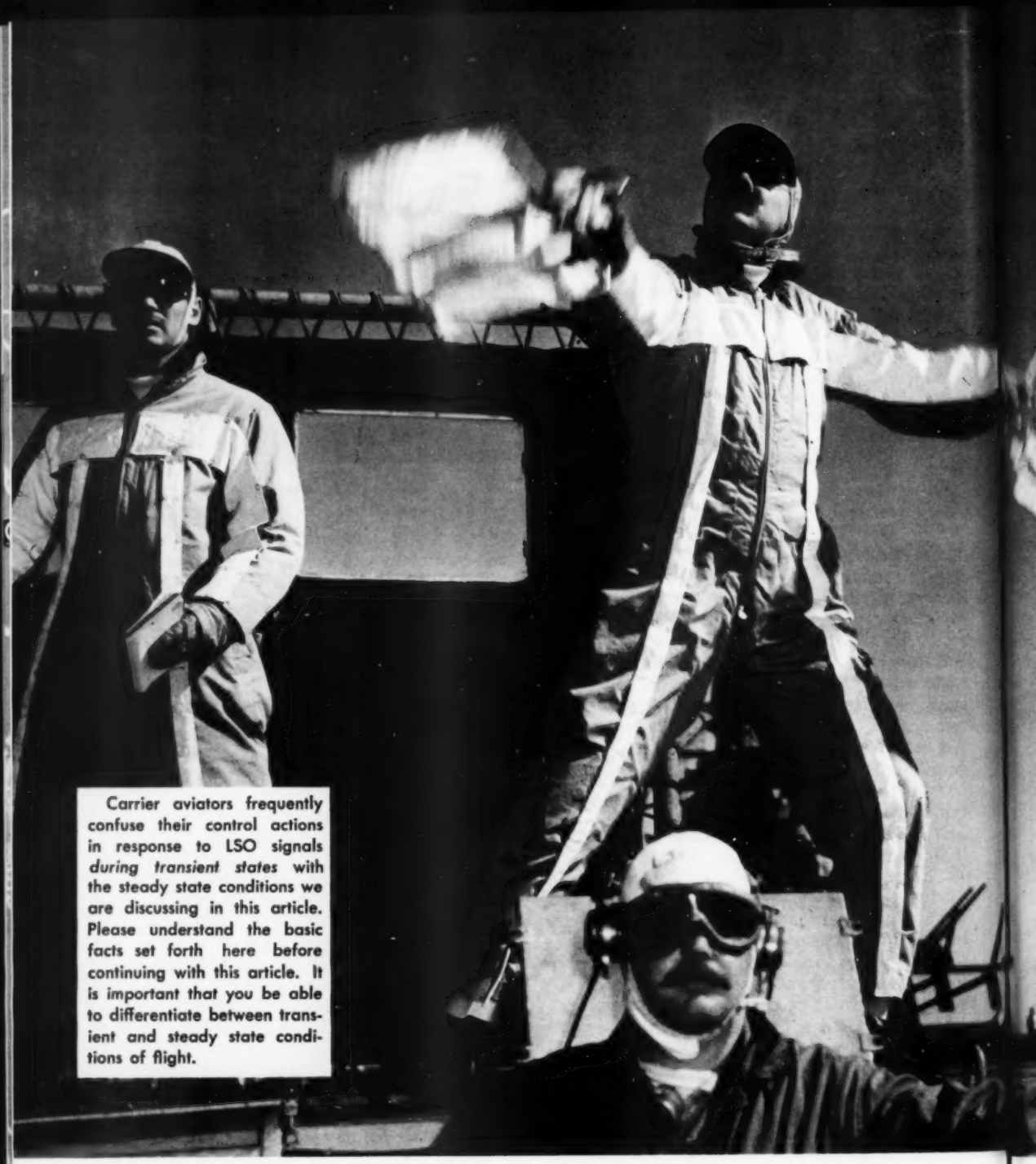
Although the pilot received the lion's share of the blame it was noted that this accident could have been avoided if the squadron maintenance department had pursued more thorough investigation of the previous landing gear operation discrepancies and that a simple dropcheck is insufficient.

SWALLOWED PINS—A loud bang was heard in the engine section of an FJ-3 after 43 seconds at military power. Inspection revealed substantial damage to all compressor stages and turbine blades as the result of a foreign object.

Traces of red cotton and material within the compressor section indicated that the foreign object was the landing gear downlock pin. The downlock pins were removed from the aircraft prior to engine runup. No engine screen was installed. ●

FOR THE RECORD

Credit was inadvertently omitted from the article "Elbow Room" in the December *Approach*, which was based on material from the *Aviation Mechanics Bulletin*, published by the Flight Safety Foundation of New York.



Carrier aviators frequently confuse their control actions in response to LSO signals *during transient states* with the steady state conditions we are discussing in this article. Please understand the basic facts set forth here before continuing with this article. It is important that you be able to differentiate between transient and steady state conditions of flight.

Region of Reverse Command

Ever hear of "The Backside of the Curve?" Or the "Region of Reverse Command?" Are you aware of the pitfalls of flying on the backside of the curve?

Whether you fly a blowpipe or a rugged reciprocator, do you know the airspeed which tells you when you are entering the region of reverse command in your particular aircraft?

In last month's *Approach*, the drag curve was discussed in some detail as an introduction to this article. In that discussion it was established that in the lower speed range of an aircraft, a HIGHER power setting is required for each REDUCTION in speed. (Yes, that's right. Read along and you can check the curve and prove it yourself).

It's really not so mysterious—you've been fooling around with it all your life as an aviator.

Before proceeding further we must be in agreement on a few of the basic facts of life of aerodynamics. These are:

(a) The *power setting* (throttle) controls the rate of climb and rate of descent.

(b) The *elevator control* (nose position) controls the indicated airspeed.

(c) *Steady state* flight implies that (1) lift equals weight, (2) thrust equals drag and (3) the airplane is trimmed at a specific airspeed.

(d) *Transient state* implies that the speed of the aircraft is being changed from a higher to a lower, or conversely, from a lower to a higher indicated airspeed.

(e) If the controls are used to maintain a constant airspeed, an excess of power at this airspeed will cause an aircraft to climb.

(f) If the controls are used to maintain a constant airspeed, a deficiency in power will cause the aircraft to descend.

(*Continued on next page*)

Region of Reverse Command
(Continued)

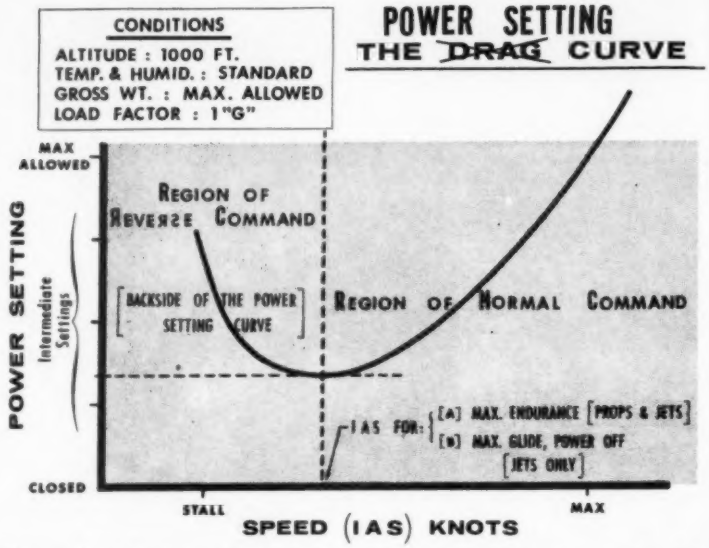
The Power Setting Curve

You will note in Figure 1 that the word "drag" has been crossed out and the words "power setting" substituted in the title of the curve.

The general *shape* of the curve allows us to use either drag or power setting as the title for the curve. For the purposes of some of the concepts which are used later on in this article, it is necessary that we title the curves "power setting."

Figure 1 is divided into two regions, a shaded area and a red area. These areas are labeled "Region of Normal Command" and "Region of Reverse Command," respectively. These two areas are divided by a vertical line which intersects the speed scale on the bottom of the drawing at a specific IAS.

The indicated airspeed, which separates these two regions on our power setting curve, can be determined for any aircraft quite simply through reference to the pilot's handbook for your specific model aircraft.



It is the *airspeed specified for maximum endurance* in the handbook and the *Rest* computer for *both* props and jets.

For jets only, it is also the indicated airspeed specified for a maximum glide with power off.

Special Note: Some handbooks will not specify an indicated airspeed for maximum endurance for props. In this case, they *usually* specify an indicated airspeed for maximum glide in the event of total power failure. This best glide speed is not determined in precisely the same manner as it is in the case of jets, therefore we can't so state in this article. However, if you use this speed to find the dividing line between the two regions on the curve, you will be almost right. (Error will be less than 10 percent).

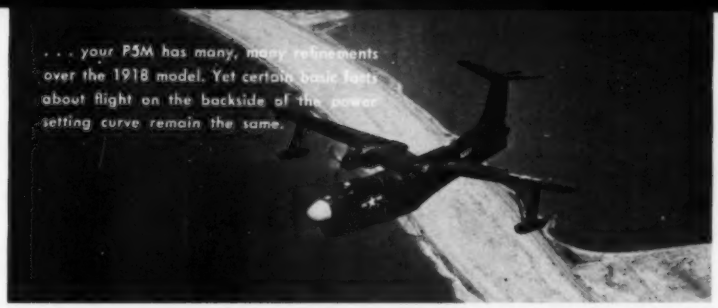
The titles which we have given to these regions are derived from the section at the beginning of this article which states:

(a) In the region of *normal* command you need a higher power setting to go faster (normal situation).

(b) In the region of *reverse* command, you need a lower power setting to go faster (situation reversed).

With this brief introduction to the regions of the power setting curve we will now examine a specific situation.

Approach


. . . your P5M has many, many refinements over the 1918 model. Yet certain basic facts about flight on the backside of the power setting curve remain the same.

The Region of Normal Command

In Figure 2 we show a situation where an aircraft is cruising at an indicated airspeed A. At this indicated airspeed. a power setting slightly lower than one-half of maximum allowed power setting is required to maintain the conditions set forth in the upper left-hand corner of the figure.

Let us assume that the aircraft has been trimmed up hands-off and is in steady state flight at indicated airspeed A.

Now, suppose that we encounter a gust which causes the nose of the aircraft to rise momentarily, resulting in a slow-down to indicated airspeed A_1. The power setting was not changed by this gust, so we now have the situation shown at point A_1.

On the curve this shows that at this slower airspeed the power setting requirement to maintain flight has been reduced; whereas, the actual power setting has remained the same as it was at point A on the curve. It is obvious that there is an excess of power setting applied over and above that required for cruise at the A_1 airspeed. Assuming that we touch neither throttles nor controls, this excess of power setting will cause the aircraft to accelerate back to the original steady-state airspeed A. At A_1 it could also begin to climb, but since we have *trimmed* for an airspeed it accelerates back to A.

Let us assume that we are again cruising in straight and level flight with the aircraft trimmed for hands-off operation at indicated airspeed A. Let us assume that we encounter a second gust, which causes the nose of the aircraft to drop momentarily, resulting in an acceleration to a new airspeed A_2.

An examination of the curve will show that at this increased airspeed the power setting required for steady state flight has increased; while, even as in the case where the gust slowed us down, the power setting has not changed and remains constant. It should be obvious from an examination of the curve that at this higher indicated airspeed we now have a deficiency in power setting. Assuming that we do not change the power setting or touch the controls, this deficiency in power setting will cause the aircraft to slow down to the original airspeed A. It won't sink because, as before, we have *trimmed* for an airspeed.

The two situations described above are normal in all respects, as the aircraft does exactly that which we would expect it to do; namely, if something causes a momentary decrease in speed, the aircraft will automatically return to the original cruising airspeed; and, conversely, if a disturbance causes a momentary increase in airspeed, the aircraft will slow down to its original airspeed.

We will now examine a similar situation in the region of *reverse* command.

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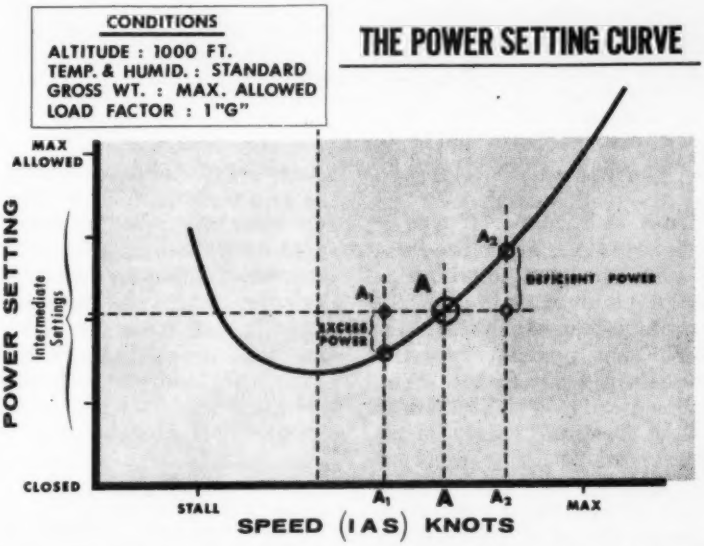

Region of Reverse Command
(Continued)
Yes, it does require a higher power setting to go slower in the Region of Reverse Command. You can prove it to yourself in Fig. 3.

The Region of Reverse Command

In this situation we will assume steady-state trimmed-up flight at an indicated airspeed B. (See Figure 3.) Assume that a gust causes the nose of the aircraft to drop momentarily, which results in acceleration to airspeed B_2. The power setting was not changed by the gust; therefore, it should be obvious from Figure 3 that at airspeed B_2 we have a higher power setting applied than is required for this new airspeed.

In sharp contrast to this similar situation in the region of normal command, the aircraft will now climb or continue to accelerate because of this excess in power setting. This *continued* acceleration following momentary acceleration is the reverse of that which we would normally expect.

Let us now assume a second and more critical situation in this region of reverse command. Again, assume that we are trimmed up for straight and level flight at indicated airspeed B. Let us assume a gust now causes the nose of the aircraft to rise momentarily, which causes a slowdown to airspeed B_1. Once again, the power setting was not influenced by this gust. It should be obvious from Figure 3 that at airspeed B_1 we now have a considerable deficiency of power.

This is because *it requires a higher power setting to go slower in the region of* ***reverse*** *command.* In this situation, if an aircraft is slowed below a steady state airspeed B, it will begin to sink or continue to slow down to the stall unless the power setting is increased immediately, or unless the airspeed is returned to B by use of elevator control.

It now becomes quite evident that any airplane being flown on the backside of the power setting curve will *not* hold an airspeed hands-off, even if trimmed. This should not be news to any carrier pilot. On the backside of the curve the *pilot* must hold the airspeed; the airplane will not hold an airspeed naturally hands-off.

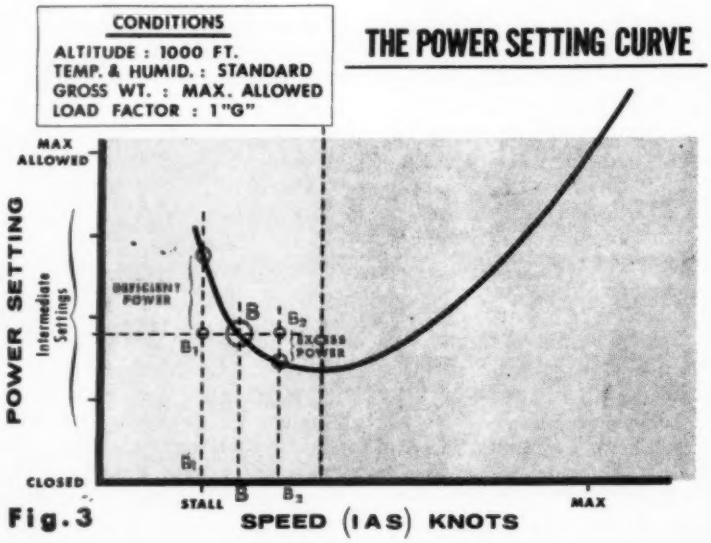

Fig. 3

Sink Rate

Assume that you are on a final approach at indicated airspeed B (Figure 3). You are trimmed up for a power approach to the runway using a power setting a little below intermediate. Assume that this has established a comfortable rate of descent and everything looks fine while you are still a half-mile from the end of the runway. Shortly thereafter you notice that your rate of descent, if continued, will cause you to undershoot.

This is the point at which most high-performance jet undershoots occur. The normal reaction is to rotate the aircraft, bringing the nose up in an attempt to reduce this rate of descent.

Before you rotate the aircraft and raise the nose, take a look at Figure 3. You are on final at airspeed B. You raise the nose, thereby reducing your speed to airspeed B_1.

You need power immediately. But you are driving a jet and power is *not available immediately!* This deficiency in power setting at your new, reduced airspeed causes the rate of descent .to increase Your act of raising the nose without concurrent increase in power setting has caused your rate of descent to increase, rather than to decrease as you intended.

You need not be driving a sweptwing jet to develop a high sink rate in this situation; you can do it in a Piper Cub, an R6D or any model aircraft you care to discuss. In the case of propeller-driven aircraft, you can usually salvage the approach by a frantic increase in power setting.

Slow acceleration of your jet engine makes the handling of sink rate a critical item. Fly it right in that "Region of Reverse Command" and you'll keep from undershooting.

The acceleration characteristics of our reciprocators, fortunately, are quite good; however, it is more "professional" to increase your power setting and maintain your original airspeed. The excess power setting in this situation will reduce your rate of descent and prevent the undershoot.

CV Pilots

Carrier pilots who read that it takes more power to go slower will immediately associate this statement with their experiences and control movements in a final approach when they receive a "fast" from the LSO (or a "slow," as the case may be). The principles discussed herein are *not* at variance with your experience, although this may seem to be the case at first glance.

Remember, when you are answering a signal on final, you have a very short period in which to change the speed of the aircraft to that desired by the LSO. In this short period, i.e., the transition period, you will undoubtedly move your throttle contrary to the thoughts expressed in this article.

However, once the transition period is over and you are again coming in on a "Roger," the power setting you have on at your new speed will correspond precisely to that which we have set forth in this article.

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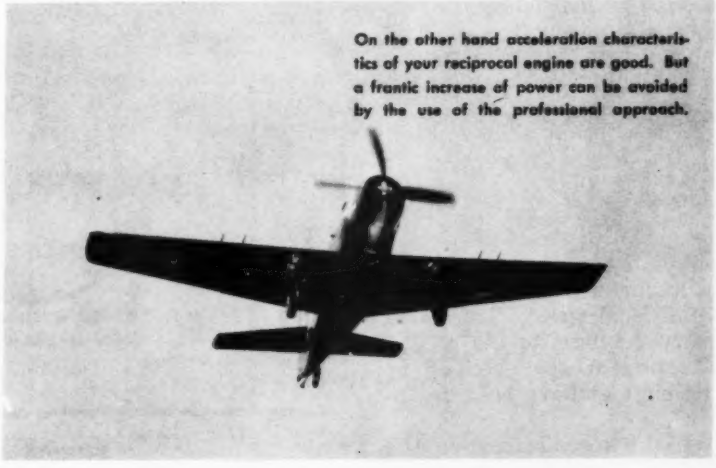


On the other hand acceleration characteristics of your reciprocal engine are good. But a frantic increase of power can be avoided by the use of the professional approach.

Region of Reverse Command
(Continued)

Brute strength will not hold your R7V up when two engines are out, but, knowledge and application of the aerodynamics of the situation will do it.

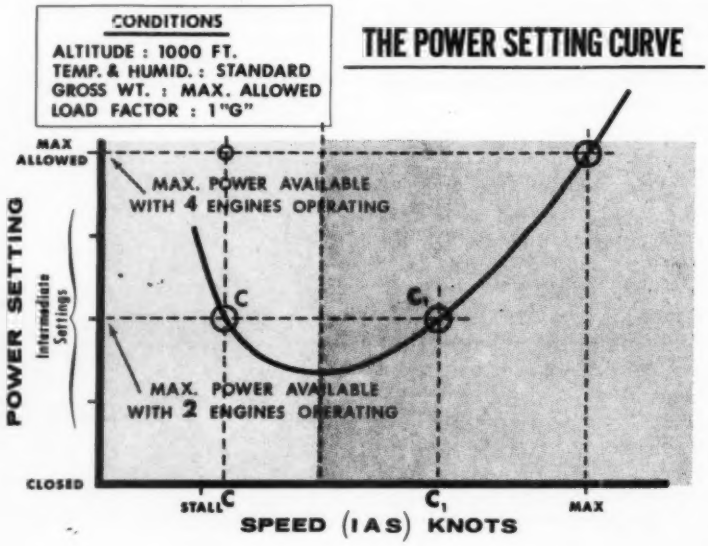
Multi-Engine Difficulties

Figure 4 is a demonstration of the situation wherein a multi-engine aircraft loses the use of one-half of the engines installed in the aircraft. At the top of the graph we show the maximum power setting available when the maximum allowed power setting is applied to all of the installed engines. The horizontal line in the center of the graph represents the situation when the maximum allowed power setting is applied after one-half of the installed engines have failed and have been feathered.

You will note that with all of the engines operating at maximum allowed power setting the aircraft has power to spare for all airspeeds on the power setting curve up to and including the maximum attainable airspeed. This is in sharp contrast to the second situation where one-half of the engines have been feathered.

In this second situation, the maximum speed attainable is shown by the vertical line from C_1. Recalling the "Drag Curve" article in the January issue of the *Approach*, you will know that the aircraft can operate at either speed C or C_1 with the same power setting.

If you operate your aircraft at speed C, you are well within the region of reverse command; and, if you make the mistake of raising the nose of the aircraft in an effort to prevent loss of altitude, you immediately have a dangerous deficiency in power setting. The aircraft immediately begins to lose altitude, and, unless you sacrifice altitude by lowering the nose and increasing your speed to C, your original error in raising the



nose will result in the airspeed rapidly falling off to the stall. Note that when you are cruising at C you have *no additional power available through an increase in power setting.*

You are already using all there is!

Above a certain altitude which is specified for each model of aircraft, you do not have sufficient power available to maintain altitude with half of your engines feathered. If you lose one-half of your available engines above this altitude, you are committed to *descend.* There are reports of accidents on file which prove that pilots have attempted to maintain level flight above this critical altitude by raising the nose and reducing airspeed. In every one of these cases, they have reduced their airspeed to C or lower and have continued to hold this speed until impact with the ground or water.

In every one of these cases, the pilot could have continued his flight safely after the aircraft had descended to below the critical altitude. All that was nececsary was a decision to lower the nose and sacrifice some altitude while the airspeed increased to C_1. The aircraft would have cruised at C_1 until fuel was exhausted and no difficulty would have been experienced in maintaining altitude.

Figure 4 and this discussion are graphic illustrations of what has occurred in several cases where the pilot of a large multi-engine transport has had the field in sight, the situation apparently under control, and suddenly stalled into the ground with fatal results.

The decision to drop the nose and sacrifice altitude for an increase in speed to C_1 is contrary to the natural human reaction to try to hold the aircraft up through sheer brute strength applied to the control column.

Brute strength will not do it; *knowledge and application of the aerodynamics of the situation will do it.*

Clean *vs* Cluttered

In this article we are discussing the general shape of the power setting curve for any given situation. The *shape* of the curve does not change materially when external items such as flaps, gear, speed brakes, etc., are extended. Power setting requirements for every point on the curve increase with each extension of external items, but the *general shape* of the curve remains the same for the considerations of this article.

This need not concern you so long as you remember to specify *clean* or *cluttered* when you get into a specific discussion of the power curve. Because we had to speak of generalities in this article, we have not so labeled our curves.

Editor's Note: Readers are requested to send in their comments on the Primer-for-Pilots series of articles—both as to their content and style of presentation. Letters to the editor need not be official, and may be submitted on Anymouse forms. ●

The general shape of the power setting curve does not change materially when external gear is extended or stores added.

TESTING 1-2-3-4

AirTransRon 31's *"News Letter"* contains the following interesting sidelight, appropriately titled "Additional Training." It reads, "Recently a squadron airman reported that the voice tube he found under the seat was out of order. He couldn't talk to the pilot through it. His discrepancy report was passed to the training department. The squadron feels that this discrepancy is a matter to be corrected by Training rather than Maintenance."

HOT CARGO

Before leaving on an extended cross-country flight a TV-2 pilot placed a plastic bag containing clothing in the nose section. The bag was hung in the left side of the nose over the inverter.

The first leg of the flight was without incident but after one hour on the second leg a warning light came on indicating the gyro instruments were inoperative. A few minutes later the gyro-horizon went out.

After landing the bag was removed and damage to the clothing was discovered. It was noted that the plastic bag melted into the perforations of the inverter and sealed the ventilating ports, overheating the unit. Sparks were prevented from reaching the clothing but enough heat was transmitted to cause burning. If the bag had been made of cloth it was felt that an open flame might have resulted.

Personal Copies Available

The Superintendent of Documents, Government Printing Office, has made the *Approach* available to the aviation industry and the general public on a per copy or subscription basis. Subscriptions may begin with Vol. 1, No. 1, July 1955, and should be ordered from Supt. of Documents, U.S. Government Printing Office, Washington 25, D. C. Price 30 cents (single copy). Subscription price: $2.50: 75 cents additional for foreign mailing.

NO SLATS — NO NOTHIN!

At the completion of a GCA practice period, the pilot of an F7U extended his landing gear without checking the position of the slats. He had previously left the slats extended, merely picking up the gear on wave-off but, on this landing, the slats did not extend.

At 140 knots on final, the plane started to settle. The pilot added MRT and eased the stick back. At about 130 knots and 10 feet altitude, the aircraft stalled and dropped to the runway in a three-point attitude. No unusual characteristics were noted until the rapid settling at 140 knots followed by the nose starting to fall through at 130 knots.

The slats did not extend due to a disconnected interlock linkage. Maintenance personnel should tag the slat lever whenever it is disconnected and check to see that it is working properly before returning the aircraft to flight status. The pilot should:

- Attempt to raise the slat lever with gear down before takeoff to make sure the interlock is working.
- Use the checklist on *every* landing.
- Check both visually and by indicator that slats are out prior to dropping the gear.

Old Pro Club

The Naval Aviation Safety Center considers that recognition of heads-up flying is essential to a positive program of flight safety. For this reason the *Approach* will acknowledge each month certain selected individuals whose exhibited flying ability merit inclusion in the "Old Pro Club" of naval aviators. Commanding officers are invited to submit nominations.

OLD PRO CLUB

ROSTER

Paul V. Rodgers, 2d. Lt., USMC
Marine Fighter Squadron 312
Aircraft: FJ-2

It was three months since designation and he was on his first familiarization flight as wingman of a section. The section became disoriented when LF homer, range and UHF homer became inoperative. Rodgers returned with aid of GCI in an extreme low fuel state. He flamed out over field, began approach at 6000 feet and successfully completed a landing. No injury or damage.

David W. McFarland, Lt. Col., USMC
HMR-1261, MAG (HR)-26
Aircraft: HRS

After transmission failure McFarland made a successful forced landing in field 250 yards by 150 yards surrounded by 60-foot trees.

William Cole Carroll, Lt., USNR
Airborne Early Warning Squadron THREE
Aircraft: P2V-5J

When 70 miles at sea on a reconnaissance flight at 1500 feet, the port engine of Carroll's aircraft backfired so severely as to require feathering. A rapid loss of altitude then made necessary the dropping of the two bomb-bay fuel tanks; only one would drop. Thereupon, at 500 feet and unable to reach base, Carroll ordered 10 major items of radio navigation gear cut loose and jettisoned. He returned to base and completed a single engine approach to a normal landing.

NO MARGIN FOR ERROR
Under instrument conditions in Alaska, a P2V flight was normal until approach clearance to its destination. Communication difficulties developed over the local radio station. GCA told the pilot to take a heading of 300 degrees. Three minutes later pilot was told to reverse course. This instruction was apparently misunderstood by pilot. Shortly thereafter, the plane crashed into the mountains.
This accident could have been prevented had the pilot been aware of his position at all times and followed emergency procedures when encountering communication difficulties with GCA
Fred Wilbur